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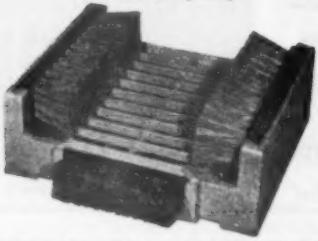

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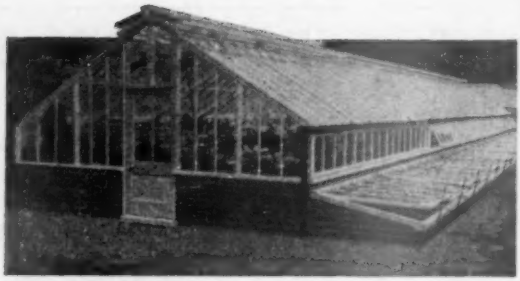

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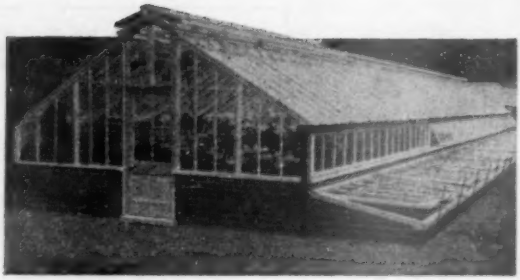

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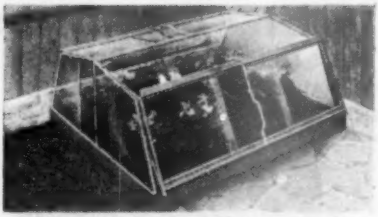

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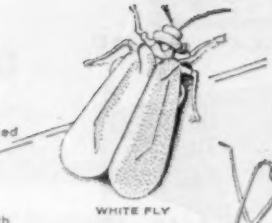
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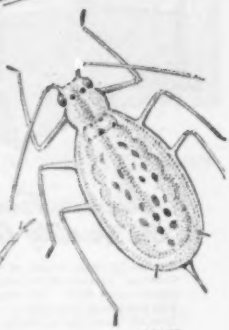
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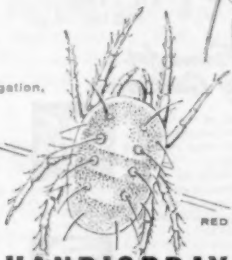
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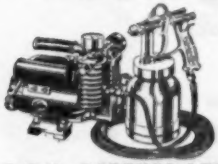

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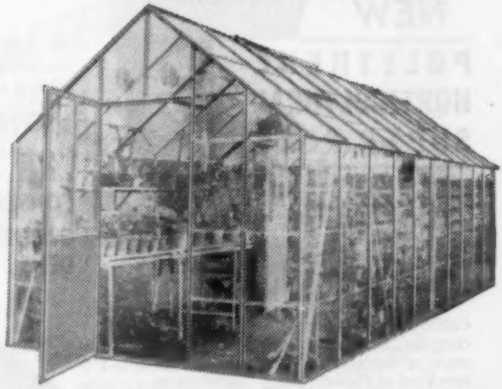

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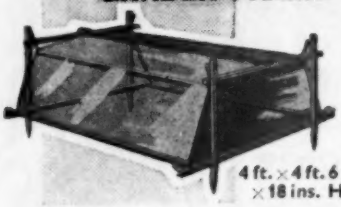

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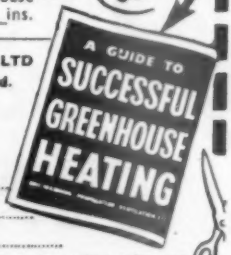

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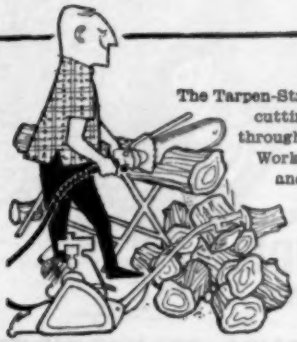

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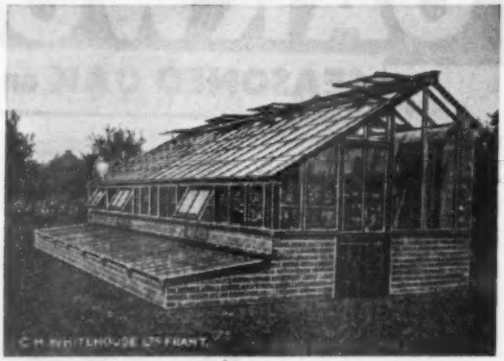

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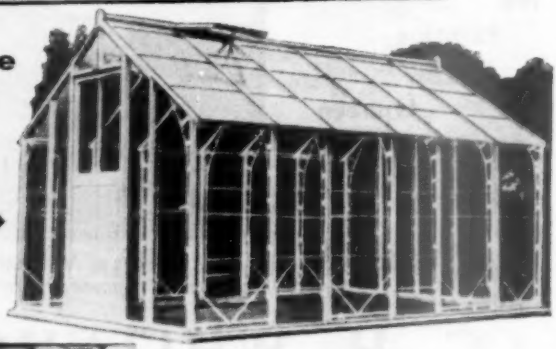

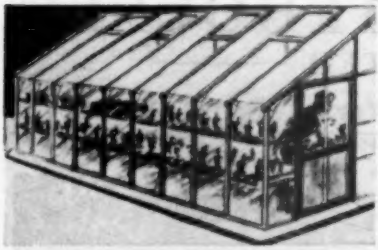

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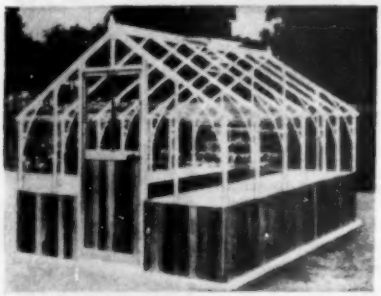

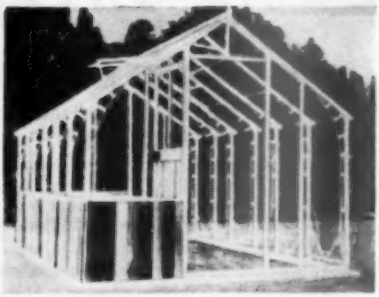

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THE ROYAL HORTICULTURAL SOCIETY

ESTABLISHED 1804 INCORPORATED 1809

NOTICE IS HEREBY GIVEN that the ONE HUNDRED AND FIFTY-SEVENTH ANNUAL MEETING of the Fellows of the Society will be held in the Society's Old Hall, Vincent Square, Westminster, on Tuesday, February 28, 1961, at 3 P.M. precisely, for the purpose of receiving the Report of the Council for the past year, and electing a President, Vice-Presidents, Treasurer, three Members of Council and an Auditor.

By Order of the Council,
A. SIMMONDS,
Secretary

THE ROYAL HORTICULTURAL SOCIETY'S OFFICES,
VINCENT SQUARE, LONDON, S.W.1.
January 23, 1961.

ANNUAL MEETING

To be held at 3 P.M., February 28, 1961

AGENDA

To confirm the Minutes of the last Annual Meeting, held on February 23, 1960.
To receive the Report of the Council.
President's Address.
Treasurer's Statement.
Adoption of Report of the Council.
Election of President.
Election of Vice-Presidents.
Election of Treasurer.
Election of Three Members of Council.
Election of Auditor.
Presentation of the Victoria Medals of Honour.
Presentation of Associate of Honour Badges.
Presentation of the Veitch Memorial Medals.
Presentation of the Jones-Bateman Cup.
Presentation of the Loder Rhododendron Cup.
Presentation of the A. J. Waley Medal.
Presentation of the Lawrence Medal.
Presentation of the Williams Memorial Medal.

AGENDA—*continued*

Presentation of the Holford Medal.
Presentation of the Farrer Trophy.
Presentation of the Reginald Cory Memorial Cup.
Presentation of the Sander Medal.
Presentation of the George Moore Medal.
Presentation of the Westonbirt Orchid Medal.

LIST OF NOMINATIONS

The following list of nominations of President, Vice-Presidents, Members of Council and Officers for election is circulated in accordance with Bye-Law 69:

	Proposed by	*Seconded by*
As President:		
The Hon. Sir David Bowes Lyon, K.C.V.O., V.M.H. . . .	Mr. E. P. F. Sutton.	Lord Digby.
As Vice-Presidents:		
Mr. S. G. A. Doorenbos Sir Ronald G. Hatton, C.B.E., M.A., D.Sc., F.R.S., V.M.H. Mr. G. W. Leak, V.M.H. Mr. F. Cleveland Morgan, M.A., D.C.L., F.R.S.C. Mr. B. Y. Morrison, B.Sc., M.L.A. Mr. H. F. du Pont Mr. J. Lionel Richardson Sir Edward J. Salisbury, C.B.E., D.Sc., LL.D., F.R.S., F.L.S., V.M.H. Monsieur Roger L. de Vilmorin, Dr. ès Sc.	The Hon. Sir David Bowes Lyon.	The Hon. Lewis Palmer.
As Treasurer:		
The Hon. Lewis Palmer, F.L.S., V.M.H.	Mr. H. G. Hillier.	Dr. H. V. Taylor.
As Members of Council:		
Mr. W. Ingwersen	Dr. G. Taylor.	Sir Giles Loder.
Mr. E. de Rothschild . . .	Sir Frederick Stern.	Sir Eric Savill.
Mr. J. L. Russell, V.M.H. . .	Lord Aberconway.	Mr. G. L. Pilkington.
As Auditor:		
Mr. F. G. Feather, F.C.A. . .	Mr. S. Ogg.	Mr. F. A. Secrett.

By Order of the Council,
A. SIMMONDS,
Secretary

January 23, 1961.

REPORT OF THE COUNCIL OF

THE ROYAL HORTICULTURAL SOCIETY

INCLUDING ACCOUNTS AND BALANCE SHEETS

FOR THE YEAR 1960

PRESENTED TO THE

ONE HUNDRED AND FIFTY-SEVENTH

ANNUAL GENERAL MEETING OF THE SOCIETY

TO BE HELD IN THE OLD HALL, VINCENT SQUARE,

WESTMINSTER

AT 3 P.M. ON TUESDAY, FEBRUARY 28, 1961

REPORT OF THE COUNCIL OF

THE ROYAL HORTICULTURAL SOCIETY

FOR 1960

THE steady growth of the Society has continued in 1960. The average net yearly increase in the number of Fellows during the fifteen years since the war has been 2,032. In 1960 the net increase was 2,732, bringing the total number of Fellows to 56,958 and the total numerical strength (i.e. Fellows, Associates, Members and Affiliated Societies) to 60,927.

There has been a corresponding increase in the subscription income, which is satisfactory. But, unfortunately, the cost of everything needed to maintain and increase the Society's activities is also continually rising. It is therefore hoped that Fellows will continue to bring the Society to the notice of their friends and make use of the nomination forms which, as in the past two years, will be sent to all Fellows with their tickets. The love of plants and gardening is so widespread that there are undoubtedly many people who would be grateful to any Fellow offering to propose them for election.

The Society's Shows and Meetings

During the year no fewer than thirty-four Shows to which Fellows' tickets gave admission were held. In addition to Chelsea Show, held in the grounds of the Royal Hospital, there were at the Halls the Great Autumn Show, the Daffodil Show, the Autumn Fruit and Vegetable Show, nineteen Fortnightly Shows and eleven Shows organized by kindred Societies for specified flowers.

Chelsea Show, which was honoured by the presence of Her Majesty The Queen and other Members of the Royal Family, was a great success. The exhibits were well up to the usual high standard and the weather fine throughout all four days. The special feature was the unusually large number of groups of orchids, including four from overseas, staged in connexion with the Third World Orchid Conference.

The demand for space at the Great Autumn Show far exceeded the combined area of both Halls. In spite of the unusually wet weather before and during the Show, the exhibits bore little evidence of gales and the attendance was greater than in 1959.

At both the Daffodil Show and the Autumn Fruit and Vegetable Show the number of competitors' exhibits was greater than for many years. The dates were those chosen by the specialists concerned as the ones most favourable for the production of exhibits, but unfortunately, as they did not coincide with the dates of Fortnightly Shows the number of Fellows and the public who found it possible to visit either of these fine Shows was smaller than at the average Fortnightly Show.

Notwithstanding the unfavourable weather the displays at the Fortnightly Shows were of good quality and many of great interest. In con-

junction with these Shows there were fifteen competitions. Three new ones, held in January, February and March, for ornamental plants grown in the open air, produced, as was expected, a good many beautiful plants which have been seldom exhibited, and which no doubt many Fellows had not previously realized could be had from the open garden at that time of year. These three competitions, which are to be repeated in 1961, promise to be exceptionally interesting and instructive. The growing popularity of camellias was evidenced by a marked rise in the number of both competitors and exhibits, of which well over five hundred were staged. As a consequence of the unusually fine summer of 1959, this year conifers throughout the country carried exceptional crops of fruits. It was therefore decided to hold a competition in October for conifers in fruit, and it proved of great interest.

In conjunction with the Shows there were nineteen lectures. The Masters Memorial Lectures were delivered by Prof. H. W. Miles, M.Sc., D.Sc., on "Insects and Horticulture".

The Third World Orchid Conference

The Third World Orchid Conference, sponsored jointly by the American Orchid Society and our Society, and held during the week following Chelsea Show, was by general consent a great success. Five hundred and nineteen persons registered as Members of the Conference and they included visitors from Australia, Belgium, Brazil, Canada, Ceylon, Colombia, Denmark, Eire, Finland, France, Germany, Holland, Iceland, Italy, Japan, Kenya, Malaya, Mexico, New Zealand, Nigeria, Poland, Puerto Rico, Rhodesia, South Africa, Sweden, Switzerland, U.S.A., Venezuela and the West Indies. The readers of papers included representatives of fifteen different countries. It is felt that, apart from the benefit resulting from the exchange of up-to-date information on a great variety of topics connected with orchids, much was gained by all who attended the Conference through the personal contacts made with orchid specialists previously known only through correspondence or literature. A full report of the Conference is with the printers and will be published shortly.

The Registration of Orchid Hybrids

Orchid hybridists throughout the world are greatly indebted to the Sander Family for the system of registration of orchid hybrids which they instituted in 1895 and have continued to carry on. Owing to the great increase in the number of hybridists during the past twenty years and the correspondingly large increase in the work of registration, Messrs. David Sander's Orchids, Ltd., expressed a desire to be relieved of the work. Having considered the matter, the Third World Orchid Conference recommended that the Society should undertake the work. Consequently, as from January 1, 1961, the Society, with the agreement and co-operation of Messrs. David Sander's Orchids, Ltd., will assume the duties of International Registration Authority for Orchid Hybrids in

accordance with the provisions of the International Code for the Nomenclature of Cultivated Plants.

The Groups

The Lily Group held four meetings and staged four co-operative displays, two of lilies and one each of fritillaries and of colchicums. Visits were made to The Hon. Sir David Bowes Lyon's garden at St. Paul's Walden Bury, and Mr. and Mrs. Martyn Simmons's garden at Quarry Wood, Burghclere. The Fruit Group took part in an excursion to East Malling Research Station and met on three other occasions. A number of exhibits of fruit were shown on the Group's Table at the Fortnightly Shows. The Rhododendron Group visited Sir Giles Loder's garden at Leonardslee, Horsham, and Sir Henry Price's garden at Wakehurst Place, Ardingly.

Publications

The JOURNAL has been published regularly and has maintained approximately the same size as in 1959. The number of colour plates has, however, tended to increase slightly. Two parts of the *Proceedings* have also been published. Two parts of the *Botanical Magazine* have been issued, thus completing the first half of volume 173. The plates were printed in colour collotype but unfortunately this has not proved as satisfactory as had been hoped and a change to another process is being made for 1961.

The Daffodil and Tulip, *Lily*, and *Rhododendron and Camellia Year Books* for 1961 have been published. The issues of the *Rhododendron and Camellia Year Book* for the previous three years have now been sold out and the printing number for the current issue has been raised.

Part VIII of the *Supplement to Elwes' Monograph of the Genus Lilium*, by Dr. W. B. Turrill, with drawings by Miss Margaret Stones, has been published. The *International Lily Register*, compiled by Miss Gillian Peterson, also appeared during the year. As stated elsewhere, the *Report of the Third World Orchid Conference* has been prepared for publication.

Four titles in the Series of Penguin Handbooks have been published during the year. These were *Hardy Herbaceous Plants* by Mr. Lanning Roper, *The Cool Greenhouse*, by Mr. G. W. Robinson, *Lawns for Gardens and Playing Fields*, by Mr. R. B. Dawson, and *Chrysanthemums*, by Mr. E. T. Thistlethwaite. All these have had satisfactory sales. A third edition of *Roses*, by Mr. F. Fairbrother, has also been published. *Dahlias*, by Mr. Stuart Ogg, will be published early in 1961 and the MS. of *Delphiniums*, by Mr. R. C. Parrett, has been delivered for publication in 1961. Good progress has also been made with *Labour Saving and Machinery in the Garden*, by Mr. Roy Hay, *House Plants*, by Mrs. Margaret Jones, the revision by Mr. E. G. Gilbert, the Society's Fruit Officer, of Mr. Raymond Bush's *Tree Fruit Growing*, and *Bulbous Plants*, Part I, by Mr. E. B. Anderson, and it is hoped that these can be delivered shortly for publication either in 1961 or early 1962. Arrangements have also been made for cloth-bound editions of three of the titles to be published in more perma-

nent form for libraries and other uses by Messrs. Geoffrey Bles Ltd., in the autumn of 1961.

The Vegetable Garden Displayed has been thoroughly revised by Mr. P. Walker, the Society's Trials Recorder, and a number of new photographs have been taken. Sections on small machines, and simple irrigating equipment have also been added. The new edition will be published early in 1961.

During the year the Editor was granted leave of absence for two months and his place was taken by Mr. Lanning Roper. Mr. J. W. O. Platt has joined the staff as assistant to the Editor.

The Library

During the year 281 books and major pamphlets were added to the Library and the Council records with appreciation various gifts of books, periodicals and other publications presented bykindred societies and individuals. The National Book League kindly presented six modern East German books of horticultural interest.

Geranium specialists will be interested to learn that the Library Committee has obtained five volumes of Trattinnick's *Neue Arten von Pelargonien . . . Als Beytrag zu R. Sweet's Geraniaceen.* 1825–31.

Other notable acquisitions include:

Adachi, C., *Camellia, its Appreciation.* 1960.
Backeberg, C., *Die Cactaceae.* Bd. 3. 1959.
Hadfield, M., *Gardening in Britain.* 1960.
Jacobsen, H. J. H., *A Handbook of Succulent Plants.* 3 vols. 1960.
Li, H. L., *The Garden Flowers of China.* 1959.
Simpson, N. D. (Compiler), *A Bibliographical Index of the British Flora.* 1960.
Seventenius, E. R., *Additamentum ad floram Canariensem.* I. 1960.
Tamayo, F., *Arboles en flor de Venezuela.* 1959.
Urquhart, B. L., *The Camellia.* Vol. 2. 1960.
Vogts, M. M., *Proteas, know them and grow them.* 1960.

Sir Frederick Stern has kindly classified the late E.A. Bowles's series of *Galanthus* drawings and this valuable collection is now contained in an album for convenient reference.

Mrs. F. Cardew, who deputized for the Librarian during the war years and subsequently was engaged in re-cataloguing the early books, left the Society's service in January. Her many friends will wish her a happy retirement.

Horticultural Education

EXAMINATIONS—The normal programme of the Society's examinations was carried out in 1960. In the General Examination in Horticulture there were 805 candidates, of whom 454 were successful. The examination for the National Certificate in Horticulture (which has taken the place of the National Certificate in Elementary Horticulture) was held at thirteen County Horticultural Institutes. There were 219 candidates in

the various sections, of whom 199 were successful, 29 passing with Credit. The Teacher's Diploma in School Gardening was awarded to 11 candidates. The National Diploma in Horticulture was obtained by 20 candidates, and the National Diploma in Horticulture with Honours by 1.

The practical tests forming part of the examinations for the National Diploma in Horticulture and the Teacher's Diploma in School Gardening were, as usual, conducted at Wisley.

Miss V. M. Hall, who has been Superintendent of Examinations for the past fifteen years, has retired and we desire to place on record our appreciation of her painstaking and efficient work.

SCHOOL OF HORTICULTURE—Thirty-five student Gardeners are taking the two-year residential course of instruction in horticulture at Wisley. Sixteen completed the course in September 1960 and fifteen of them gained the Wisley Diploma, five with Honours.

SCHOLARSHIPS—The Scholarship sponsored jointly by the Society and the Worshipful Company of Gardeners has been awarded to Mr. R. H. Dungey to enable him to study nursery practice in the United States.

The Bowles Memorial Travel Scholarship has been awarded to Mr. R. H. Rule to enable him to accompany a plant-hunting expedition to Burma to collect orchids and other plants of horticultural value.

Garden Advisory Service

The services of the Society's Garden Adviser, Mr. Tuffin, have continued to be in great demand and those who would like to have his advice usually need to give at least a fortnight's notice. Sometimes he is called upon to visit the same locality twice in a short period, and that is wasteful of his time. That could be avoided if it were more generally realized that, where two Fellows in the same neighbourhood have problems of such a nature that they could both be dealt with in one day, arrangements can be made for the Garden Adviser to visit both Fellows on the same day and for them to share the cost of the visit.

Plant-collecting Expedition

A small expedition was undertaken this summer by Rear-Admiral P. Furse and Mr. P. M. Synge, the Society's Editor, to collect and study the plants, particularly the bulbous plants, of the mountains of Eastern Turkey and Northern Iran. The party made a large collection of bulbs and other plants which is now being grown at Wisley and from which material has already been distributed to several botanic and private gardens. The collection of herbarium material, about 950 numbers, has been presented to the Royal Botanic Gardens, Kew. Many of the bulbs had finished flowering when collected and so their identification cannot be completed until they flower again in this country, but several interesting species of *Tulipa*, *Crocus*, *Colchicum*, *Iris* and *Fritillaria* were collected. Particularly interesting were the Oncocyclus irises seen and collected. Among the collections is a species of *Lilium* with tall stems and recurved Turk's-cap yellow flowers with maroon centres which may prove to be an

undescribed species, or at least one new to cultivation in this country. The expedition from the time it left Ankara to its return there, covered just over 6,000 miles in two months and went as far east as Meshed, which is close to the Iranian–Afghan–Russian frontier.

Property in London

During the year the Lecture Room has been improved by the installation of modern sound-reinforcement equipment, the fitting of double windows to exclude the noise from the adjacent school playground, and the provision of additional ventilation.

The lift to the Lecture Room and Committee Rooms in the New Hall, which was put in when the Hall was built thirty-two years ago is being replaced by a modern lift which should be ready for use by the end of February.

In order to enable the Caterers to provide a more rapid service of light refreshments, the restaurant premises in the basement of the New Hall are being enlarged. It is believed that the improved facilities will be appreciated by Fellows and other visitors to the Society's Shows, and also by the organizers of exhibitions who hire the Hall.

The Wisley Property

In these days of full employment the ability to engage and retain sufficient staff often depends on the availability of modern living accommodation. It has therefore been decided to build two more cottages in Wisley village for the use of permanent staff, and four bungalows to accommodate retiring members of the staff who occupy cottages which will be required for their successors. It is hoped that this building programme will enable the Society to retain an adequate and well-housed permanent staff, and at the same time provide for retired members of the staff who would like to continue to live in the village where they have spent so many years of their working lives and feel at home.

The Gardens

The weather at Wisley in 1960 was very different from that in the previous year and the rainfall for the year ending October 31 was 32·88 in., against an average of 24·15. In 1959 the drought finally broke in mid-October and for most months since then the rainfall has been above average. The only severe weather experienced was during mid-January and snowfall was negligible. During the summer a temperature of 70° F. or over was reached on only forty-nine days compared with one hundred and five in 1959.

VISITORS TO THE GARDENS—The total number of visitors to the Gardens was 217,255, the highest number so far recorded, compared with 195,252 in 1959, an increase of 22,003. The greatest number on one day was 5,136 on June 6. The total number of Sunday visitors was 46,438, compared with 41,144 in the previous year. The various demonstrations given by members of the staff were again well attended.

ALTERATIONS and improvements were made in various parts of the Gardens, the most important being the installation of an additional water supply. This involved the laying of a new water main and the provision of two additional pumps, new pump houses and a storage tank to hold about 60,000 gallons.

A new system of labelling the permanent plants has been adopted, by using an electrically operated engraving machine and laminated plastic black labels with white lettering.

Primulas have been planted in large numbers in the Wild Garden and on Battleston Hill, and a new planting of camellias and lilies has been carried out near the new water storage tank.

The hybridization of camellias, rhododendrons and azaleas has continued and one Wisley-raised rhododendron gained an Award of Merit and five azaleas were Highly Commended.

The model vegetable garden was cropped for the first time and created much interest among visitors.

EXHIBITS—The Curator as Executive Officer for the British Committee for Overseas Flower Shows was responsible for the selection and collecting together of numerous plants at Wisley from many sources, and timing these to flower for the large exhibit which he designed and staged at the Ghent Quinquennial Exhibition in Belgium in April. The Curator was also responsible for designing and staging a large informal garden at the Chelsea Flower Show. The work involved in preparing for these two major exhibits made large demands on the Gardens staff and glasshouse space.

GIFTS TO THE GARDENS—The Council wishes to express its gratitude for many gifts of plants and seeds and special mention is made of a large collection of saxifrages and other rock-garden plants from The Principal, Waterperry Horticultural School, Wheatley, Oxon.; lily bulbs from Mr. Jan de Graaf, Oregon Bulb Farms, U.S.A., and Mr. K. Wada, Hakoneya Nurseries, Japan; a collection of viburnum from Dr. D. R. Egolf, National State Arboretum, Washington, D.C., U.S.A.; six plants of *Daphne juliae*—a new species at Wisley—from the Moscow Botanic Garden; an extensive collection of seeds for the Annual Border from Messrs. Sutton & Sons Ltd. and Messrs. Watkins & Simpson Ltd. Collections of seeds were sent by way of exchange from a number of botanical and horticultural institutions throughout the world.

DISTRIBUTION OF SURPLUS SEEDS—The number of packets of seeds distributed was 61,799, compared with 64,898 in the previous year.

PLANTS RECEIVED FROM EXPEDITIONS—A large collection of bulbs, plants and seeds was received from the expedition to Turkey and Iran made by Rear-Admiral Furse and Mr. Synge, and it is hoped that many of these will be seen in flower in the Rock-Garden Department next year. Further material from Turkey was also received from an expedition made by Mr. A. Stainton and Mr. D. M. Henderson.

ADVISORY WORK—The Laboratory Staff was extremely busy throughout the year dealing with numerous enquiries from correspondents and

callers. 1,639 visitors called at the Laboratory, compared with 1,804 in 1959. The establishment and maintenance of lawns formed the subject of many enquiries, and advice was again sought about weed control, particularly in connexion with the use of herbicides. Much interest was shown in garden machinery and a member of the staff attended various demonstrations to gain up-to-date information. The number of specimens of plants received for identification exceeded 4,000.

SCIENTIFIC INVESTIGATIONS—The breeding and selection of antirrhinums resistant to rust disease (*Puccinia antirrhinii*) has continued, but the past season has been very difficult for collecting good seed. Seed of the new resistant white variety 'Polaris' is still not available in sufficient quantity for distribution. Some information has been collected on the "petal blight" disease of chrysanthemums (*Itersonilia perplexans*). Data are also being collected on the cause of leaf spot or blight of paeonies and its possible relationship with the fungus causing the well known stem wilt disease (*Botrytis paeoniae*).

The Entomologist has assisted in carrying out further trials of soil sterilants in carrot plots at the Vegetable Trial Grounds. Previous results are confirmed, i.e. that methyl bromide gives increased yields although it does not eliminate the condition affecting the carrots. For the last two seasons leeks in the Trial Grounds have been attacked by the Leek Moth (*Acrolepia assectella*), a new pest in this area. Observations have been made at Wisley and in the neighbourhood and control experiments are contemplated for next year.

The Entomology Department staged an exhibit at Chelsea Show dealing with the recognition and preservation of beneficial insects in the garden, and the Entomologist gave a lecture on February 9 on "The Uses of Modern Insecticides in the Garden", which was published in the July JOURNAL.

Horticultural Pests, Detection and Control, by the late G. Fox Wilson, was revised by the Entomologist and published in May. The Entomologist has also revised the section on pests in the Penguin Book on Fruit Growing, at present being revised by the Fruit Officer.

A room in the Laboratory has been adapted for use as a photographic studio and is equipped with electronic flash equipment.

FLORAL AND VEGETABLE TRIALS—In a difficult season the trials have in general been disappointing and the cool and wet weather of the summer months with sunshine below average has made judging difficult in some of the trials.

In the year under review the permanent floral trials have been continued as in previous years. The trial of delphiniums flowered exceptionally well and was outstanding. An interesting feature of this trial was the addition of seventeen dwarf varieties of *Delphinium elatum* which were judged at Wisley for the first time. Gladioli also flowered very well and the trial was the best seen for at least the past three years. The trial of intermediate bearded irises was seen at its best, many of the plants being very floriferous, while the trial of tall-bearded irises was not seen to

advantage as the greater part of the trial had been replanted in 1959 on a fresh site near the frame-yard wall. Dahlias once again bloomed very freely and attracted much interest.

The other permanent trials included those of border carnations, daffodils, early-flowering chrysanthemums, garden pinks, Michaelmas daisies, paeonies, pyrethrums, rhododendrons, sweet peas, varieties of *Hemerocallis* and varieties of perennial phlox.

In the invited flower trials the largest was that of annual asters. This trial which numbered 170 entries included some interesting novelties. The trial of *Bellis perennis* grown from seed produced some level stocks and provided a welcome splash of colour to the Trial Grounds in early spring. The invited trials grown from seed also included cornflowers. The trials of alyssums and *Phlox drummondii* grown from seed were not judged. The invited trials grown from plants included heucheras, kniphofias, varieties of *Anemone hybrida*, trollius and zonal pelargonium.

Of the invited vegetable trials, the outstanding one was that of broad beans. The trial of autumn-sown cabbages also did exceptionally well and clearly indicated the value of good stocks of seed in a season when "bolting" wa particularly bad. Trials of cauliflowers, celery and leeks were also grown. A trial of winter cauliflowers (broccoli) was not judged. The trial of rhubarbs planted in 1957 was judged and included a number of Dutch stocks which were inspected for the first time.

A trial of early carrots grown under Dutch lights and frames produced roots of excellent colour and this was followed by a trial of dwarf French beans which was sown in July and protected with glass by the middle of September.

A collection of varieties of *Calluna vulgaris* made up of fifty stocks of twelve plants of each was planted in April 1959. Judged by a sub-committee of Floral B in August and September 1960, eight varieties received the Award of Merit and five were Highly Commended. This collection has created much interest and plants of varieties new to the collection have been added to the original planting.

FRUIT DEPARTMENT—Fruit crops generally were some of the poorest on record. Apples were the one exception and the majority of varieties carried a heavy crop. Plums were the biggest disappointment, as in spite of flowering profusely, the set of fruit was negligible. This may have been due as much to weakness following the 1959 drought as to frost and cold winds at the time of flowering. Severe bird damage to peach, pear and plum buds again occurred during the winter on trees and in the Model Fruit Gardens.

National Fruit Trials

The National Fruit Trials at Wisley officially closed on September 30, 1960, after thirty-eight years of co-operation between the Society and the Ministry of Agriculture. The transfer of plant material to Brogdale has been completed and the three orchards and nursery at Wisley have been

Photo: J. E. Downward

PLANNING AND PLANTS FOR THE SMALL GARDEN

FIG. 12—*Euphorbia wulfenii*. A majestic spurge with large heads of yellow-green flowers (see p. 82)

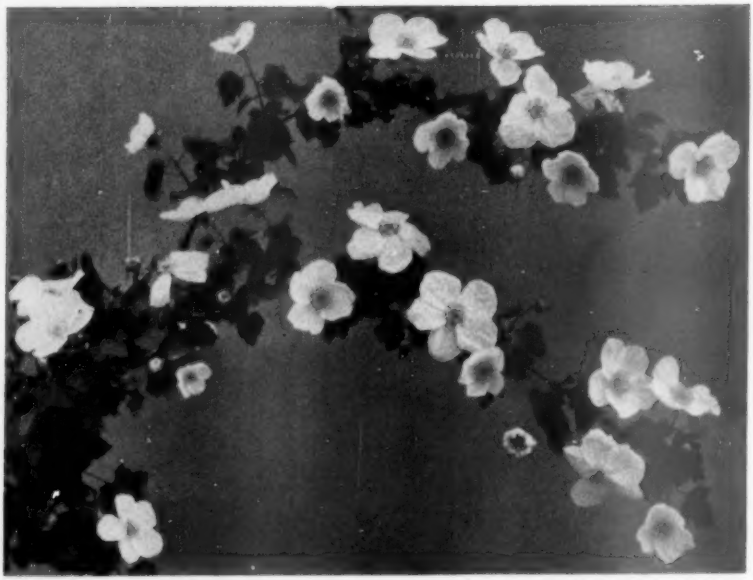


FIG. 13—*Rubus* 'Tridel'. A very useful hybrid shrub for a small garden (see p. 82)

Photos: J. E Downward

FIG. 14—Philadelphus 'Beauclerk'. A fine hybrid raised by the HON LEWIS PALMER, V.M.H., which is very suitable for a small garden (see p. 80)

Photo: J. E Downward

FIG. 15—*Halesia monticola* var. *vestita*. A useful tree for a small miniature wood (see p. 76)

Photo: T. C Leaman

FIG. 16—The Westonbirt Orchid Medal reproduced natural size. presented by MR. H. G. ALEXANDER to commemorate the Westonbirt Collection of Orchids (see p. 55)

Photo: J. E Downward

FIG. 17—*Stachys lanata*. A useful silver-grey foliage plant for ground cover for informally planted beds (see p. 81)

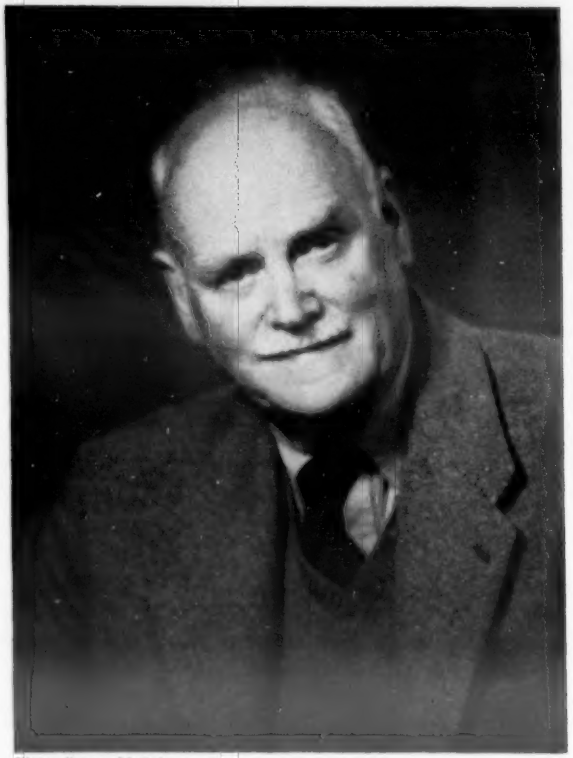


Photo: Jeremy McCabe

FIG. 18—MR. E. B. ANDERSON

Photo: R. Kingsley Taylor

VICTORIA MEDAL OF HONOUR, 1960

FIG. 19—MR. STUART OGG

grubbed and cleared of fruit trees except for a small area in which trees have been left for use in examinations.

The connexion between the National Fruit Trials and the Society is not completely severed as two representatives of the Society sit on the Brogdale Committee.

The Long-Service Medal

During the year 163 applications were received for the Society's Long-Service Medal which is available to a man or woman of British Nationality resident in the United Kingdom, who has completed not less than forty years of satisfactory and continuous employment as a gardener or in some other horticultural capacity in a private, commercial, public or botanical garden, nursery, market garden, fruit plantation or seed trial-ground with one employer or in one place. One hundred and fifty-nine medals have been awarded, twenty-three with one bar for fifty years' service and two with two bars for sixty years' service. In addition two previous holders of the medal have received a bar and two other holders have received a second bar.

Bequest

The Council gratefully acknowledges the receipt of a handsome bequest to the Society from a Fellow, the late Mrs. Emmie Clough, of Failand, Somerset, who left her books on gardening for the use of the student-gardeners at Wisley and bequeathed the residue of her estate, viz. £6,058, to the Society.

The Westonbirt Orchid Medal

With a view to commemorating the famous Westonbirt Collection of orchids which has had such an influence on the evolution of modern cymbidium hybrids, and at the same time to encourage the breeding and exhibition of orchids and to recognize other outstanding achievements in connexion with orchids, Mr. H. G. Alexander, with the approval of the Council, has struck and endowed a medal to be known as "The Westonbirt Orchid Medal" (Fig. 16). This valuable gift will enable the Society to offer for award annually a medal in gold for the best new orchid of any family, for the most meritorious group of orchids, for the most finely grown specimen orchid, or for any scientific, literary or other outstanding personal achievement in connexion with orchids. The Council desires to record its cordial appreciation of Mr. Alexander's generosity.

The Mrs. F. E. Rivis Prize Fund

The Council also gratefully records the receipt of another welcome gift from Miss A. K. Hincks, who has presented to the Society £500 to establish in commemoration of her sister, Mrs. F. E. Rivis, a trust fund, to be known as "The Mrs. F. E. Rivis Prize Fund", for the encouragement of excellence in cultivation. In 1961 the interest from this fund will be used to provide a prize for the gardener or other employee responsible

for the cultivation of the exhibit for which the Williams Memorial Medal is awarded.

Obituary

It is with great regret that we record the death during the past year of Mr. Ralph S. Peer of Los Angeles, a camellia enthusiast of international repute, and of Miss C. Beck, an authority on fritillaries. We also record with great regret the passing of five holders of the Victoria Medal of Honour: Dr. John Macqueen Cowan, an authority on rhododendrons; Mr. Charles Eley, who had an extensive knowledge of trees and shrubs; Mr. W. E. Th. Ingwersen, who possessed an encyclopaedic knowledge of alpine plants; the Hon. Robert James, who was a successful cultivator of lilies and of plants generally considered too tender for the northern counties; and Mr. George H. Johnstone, who was an expert on magnolias and daffodils. The Staff at Wisley has sustained a heavy loss by the death of the Botanist, Mr. N. K. Gould, an Associate of Honour and for many years Secretary of Floral Committee B. We also record with a sense of loss the death of five other Associates of Honour: Mr. A. Blackburn, Mr. S. W. McLeod Braggins, Mr. B. Hills, Mr. W. Phillips, and Mr. T. S. Wells.

Annual Awards

THE VICTORIA MEDAL OF HONOUR—The Victoria Medal of Honour was established "to enable the Council to confer conspicuous honour on those British horticulturists resident in the United Kingdom whom it might from time to time consider deserving of special honour at the hands of the Society". The number of recipients is restricted to 63, the number of years of Queen Victoria's reign. Five vacancies having occurred in the roll, the distinction has been awarded to three outstanding amateur gardeners: Mr. E. B Anderson, an expert on alpines and hardy bulbous plants; Mr. L. Maurice Mason, an outstanding exhibitor of greenhouse plants and of trees and shrubs; and Mr. G. L. Pilkington, an authority on irises, conifers and shrubs; and to one nurseryman, Mr. Stuart Ogg, a prominent exhibitor of dahlias and chrysanthemums.

ASSOCIATESHIP OF HONOUR—The Associateship of Honour, which is conferred on "persons of British nationality who have rendered distinguished service to Horticulture in the course of their employment", has been awarded to Mr. J. R. B. Evison, Director of Parks, Brighton; Mr. G. Groves, Director of Agriculture, Bermuda; Mr. R. C. McMillan, Director of Parks, Manchester; Miss Mary Page, Horticulturist, Wye College; Mr. E. G. Ramsey, General Manager to Mr. Stuart Ogg; and Mr. R. Sayers, Gardener to Mr. L. Maurice Mason.

THE VEITCH MEMORIAL TRUST—Awards made under the Veitch Memorial Trust "to those who have helped in the advancement and improvement of the science and practice of Horticulture" are as follows: Gold Medal to Dr. H. Harold Hume for his work for the advancement of horticulture and in particular for his work in connexion with camellias;

Gold Medal to Sir Frederick Stern for his contribution to horticultural literature and other services to horticulture; Silver Medal and £25 to Dr. Leslie Ahrendt for his work on the genus *Berberis*; Silver Medal to Mrs. C. B. Saunders for her work in connexion with species of *Cyclamen*; Silver Medal to Mr. Theo. Stephens for his contribution to horticultural literature.

THE JONES-BATEMAN CUP, which is offered for award triennially "for original research in fruit culture which has added to our knowledge of cultivation, genetics or other relative matters" has been awarded to Mr. A. Gavin Brown for his research work on the inheritance of diseases in apples and pears, the inheritance of shape, size and season of ripening in apples, and other matters relating to the breeding of fruits.

THE LODER RHODODENDRON CUP, which is awarded for work in connexion with rhododendrons, has been awarded to Mr. O. C. A. Slocock.

THE A. J. WALEY MEDAL, which is awarded to a working gardener who has helped the cultivation of rhododendrons has been awarded to Mr. J. G. Cannon.

THE LAWRENCE MEDAL, "for the best exhibit shown to the Society during the year" has been awarded to Messrs. Hillier & Sons for an exhibit of conifers on October 11.

THE WILLIAMS MEMORIAL MEDAL, "for a group of plants and/or cut blooms of one genus (fruit and vegetables excluded) which show excellence in cultivation", has been awarded to Messrs L. R. Russell Ltd. for an exhibit of fuchsias at Chelsea Show.

THE HOLFORD MEDAL, "for the best exhibit of plants and/or flowers (fruit and vegetables excluded) shown by an amateur during the year in the Society's Halls", has been awarded to Lt.-Col. The Lord Hothfield for an exhibit of cymbidiums on March 8.

THE GEORGE MOORE MEDAL, "for the new *Cypripedium* which shows the greatest improvement on those of the same or similar parentage and which was submitted to the Society during the year" has been awarded to Messrs. R. & E. Ratcliffe for *Cypripedium* H. Rushton 'Everest'.

THE REGINALD CORY MEMORIAL CUP, which is awarded to the raiser of a hardy hybrid which is the result of an intentional cross, has been awarded to Capt. Collingwood Ingram for *Cistus* × Crispal 'Anne Palmer'.

THE SANDER MEDAL, "for the best new greenhouse plant of general utility shown to the Society during the year" has been awarded to The Parigo Horticultural Company, Ltd., for Freesia 'Fantasy'.

THE WESTONBIRT ORCHID MEDAL, "for the best new *Cymbidium* shown to the Society during the year" has been awarded to Mr. F. Stewart for *Cymbidium* San Francisco 'Meadow Mist'.

THE FARRER TROPHY, "for the best exhibit of plants suitable for the rock garden or alpine house shown to the Society during the year at one of the Society's Shows at the Halls", has been awarded to Messrs. W. E. Th. Ingwersen, Ltd. for their exhibit of rock-garden plants shown on April 20.

Committees, Judges, Lecturers and Examiners

The Council wishes to record its appreciation and thanks to those who have so generously given of their time and knowledge in serving on Committees or acting as Judges, Lecturers or Examiners. Without their help it would be impossible to carry on the Society's many-sided work.

The Press

The Council also wishes to place on record the Society's indebtedness to the Press for the publicity it gives to the Society's activities and for its help in extending a love of horticulture.

The Council

Under Bye-law 55, in every year the three Members of Council, other than the President, who have been longest in office since their election shall retire after the annual meeting. The retiring Members in 1961 are Mr. J. S. L. Gilmour, Sir Thomas Neame and Mr. F. A. Secrett. The Society is greatly indebted to them for the work they have done as Councillors, and Fellows will be glad to learn that all three have agreed to continue to serve on various Committees.

Signed on behalf of the Council,
D. BOWES LYON,
President.

December 31, 1960.

THE NUMERICAL STRENGTH OF THE SOCIETY ON DECEMBER 31, 1960

	Strength on Dec. 31 1959	Losses in 1960			Elections and Admissions in 1960	Adjustments	Net increase or decrease during 1960	Strength on Dec. 31 1960
		By Death	By Resignation	Total				
Life Fellows	1,334	37	—	37	17	+8 (a)	— 12	1,322
Fellows	52,865	600	2,983	3,583	6,335	−8 (b)	+2,744	55,609
Associates	1,438	6	108	114	178	—	+ 64	1,502
Affiliated Societies	2,274	—	66	66	143	—	+ 77	2,351
Junior Members	—	—	—	—	17	—	+ 17	17
Student Members	2	—	2	2	1	—	— 1	1
Honorary Fellows	27	—	—	—	—	—	—	27
Associates of Honour	98	6	—	6	6	—	—	98
	58,038	649	3,159	3,808	6,697	—	+2,889	60,927

(a) Life Fellows transferred from Fellows. (b) Fellows transferred to Life Fellows.

Dr. GENERAL INCOME & EXPENDITURE ACCOUNT

1959 £	1959 £		£	£
		To LONDON—		
		ESTABLISHMENT EXPENSES LESS ALLOCATIONS—		
5,058		Rent, Rates and Taxes	4,810	
20,084		Salaries and Wages	21,703	
14,575		Other Establishment Expenses, including Light, Fuel, Stationery, Professional fees, Renewals, etc.	15,368	
	39,717			41,881
		,, WISLEY—		
	60,539	Net Expenditure for Year, as per separate Account.		65,767
		,, PUBLICATIONS—		
38,562		Journal	43,003	
14,797		Other Publications	14,825	
53,359			57,828	
24,180		*Less* Sales, Advertisements and Royalties	24,464	
	29,179			33,364
	2,631	,, STAFF PENSION SCHEME		2,821
		,, MEETINGS—		
		Expenses, Labour and Overheads of Special and other		
52,989		Meetings	58,505	
52,342		*Less* Receipts	57,929	
	647			576
	1,114	,, CUPS AND MEDALS		760
		,, CONTRIBUTIONS TO LINDLEY LIBRARY, as per Trust Account—		
	1,919	Salaries and direct expenses		1,444
		,, SPECIAL EXPENDITURE—		
358		Donations	593	
—		Expeditions	1,000	
874		*Contribution to the cost of the British Exhibit at Paris Floralies 1959*		
	1,232			1,593
	961	,, BOTANICAL MAGAZINE		1,704
		,, EXAMINATIONS IN HORTICULTURE—		
4,563		Expenses	4,776	
2,916		*Less* Fees	2,975	
	1,647			1,801
300		,, SCHOLARSHIP	340	
		Less Contributions from— £		
135		Worshipful Company of Gardeners 155		
30		Sir James Knott Trust 30		
165			185	
	135			155
	139,721	Carried forward		151,866

FOR THE YEAR ENDED 31st DECEMBER, 1960 Cr.

1959 £	£		£	£
	142,646	By Annual Subscriptions and Donations		151,193
		,, Life Compositions—		
	616	Being amounts transferred in respect of Life Fellows who have died during the year		838
12,492		,, Dividends and Interest	13,486	
		Less Allocated to— £		
6,408		Old and New Halls Rebuilding Reserve . 6,988		
227		Shows Contingency Reserve . . . 243		
333		Supplementary Pension Reserve . . 443		
6,968			7,674	
	5,524			5,812
	18,949	,, Hall Lettings, Gross		21,298
		,, Restaurants—		
	620	Receipts, less Expenditure (including proportion of Overheads)		582
		,, Botanical Magazine—		
	284	Net Proceeds of Sales of Old Plates and Texts		72
	1,052	,, Rent of Freehold Property (Wisley)		1,082
	169,691	Carried forward		180,877

Dr. GENERAL INCOME & EXPENDITURE ACCOUNT

1959 £		£
139,721	Brought forward	151,866
3,366	To Old and New Halls Rebuilding Reserve Appropriation	3,366
2,000	,, *Supplementary Pension Reserve Appropriation*	
15,000	,, Transfer to Contingency Reserve	10,000
6,000	,, Transfer to Provision for Maintenance of Premises, London	13,000
1,000	,, *Transfer to Provision for Maintenance of Plant and Premises, Wisley*	
2,604	,, Balance, added to General Reserve	2,645
£169,691		£180,877

FOR THE YEAR ENDED 31st DECEMBER, 1960—*cont.* Cr.

1959 £		£
169,691	Brought forward	180,877
£169,691		£180,877

Dr. WISLEY GARDENS—INCOME & EXPENDITURE

1959 £	1959 £		£	£
		To Establishment Expenses—		
11,291		Salaries and Wages	12,569	
2,799		Rates and Insurances	2,946	
7,620		Miscellaneous	8,267	
1,087		Annuities	1,133	
	22,797			24,915
		,, Laboratory and School of Horticulture—		
5,443		Salaries and Wages	5,617	
322		Miscellaneous	358	
65		Depreciation of Equipment	79	
	5,830			6,054
		,, Gardens—		
21,454		Salaries and Wages	23,892	
9,299		Hostel—Maintenance and Board	9,295	
858		Seed Distribution *less* Receipts	714	
5,730		Miscellaneous	6,031	
1,470		Depreciation of Plant and Equipment	1,131	
	38,811			41,063
		,, National Fruit Trials— (Direct expenditure)		
2,023		Wages	1,524	
252		Miscellaneous	139	
	2,275			1,663
	2,008	,, Staff Pension Scheme		2,203
	£71,721			£75,898

ACCOUNT FOR THE YEAR ENDED 31st DECEMBER, 1960 Cr.

1959 £	£		£	£
		By DIVIDENDS AND INTEREST ON WISLEY ENDOWMENT FUND		
	927	INVESTMENTS		927
		,, GARDENS—		
	8,483	Entrance Fees and Miscellaneous Receipts		7,707
		,, NATIONAL FRUIT TRIALS—		
332		Sales	57	
1,440		Grant from Ministry of Agriculture	1,440	
	1,772			1,497
		,, BALANCE, carried to General Income and Expenditure		
	60,539	Account		65,767
	£71,721			£75,898

1959 £	1959 £		£	£	£
		CAPITAL FUNDS AND RESERVES			
	250,000	ACCUMULATED FUNDS ACCOUNT		250,000	
		GENERAL RESERVE ACCOUNT—			
123,552		Balance at 31st December, 1959	127,533		
2,604		*Add* Balance of Income and Expenditure Account, 31st December, 1960	2,645		
126,156			130,178		
1,377		*Add* Net Profit on Realization of Investments	1,490		
	127,533			131,668	
	—	Legacy Account—Mrs. E. Clough, decd.		6,059	
	377,533				387,727
		REBUILDING AND OTHER RESERVES			
		OLD AND NEW HALLS REBUILDING RESERVE—			
149,034		Balance at 31st December, 1959	158,808		
6,408		*Add* Allocation of Dividends and Interest	6,988		
3,366		Allocation from Income and Expenditure Account	3,366		
	158,808			169,162	
		SHOWS CONTINGENCY RESERVE—			
5,288		Balance at 31st December, 1959	5,515		
227		*Add* Allocation of Dividends and Interest	243		
	5,515			5,758	
		SUPPLEMENTARY PENSION RESERVE—			
7,736		Balance at 31st December, 1959	10,069		
333		*Add* Allocation of Dividends and Interest	443		
2,000		*Allocation from Income and Expenditure Account*			
	10,069			10,512	
		CONTINGENCY RESERVE—			
—		Balance at 31st December, 1959	15,000		
15,000		*Add* Allocation from Income and Expenditure Account	10,000		
	15,000			25,000	
	189,392				210,432
		LIFE COMPOSITIONS			
34,988		As at 31st December, 1959		35,096	
616		*Less* Amount transferred to Income in respect of Life Fellows who have died during the year		838	
34,372				34,258	
724		*Add* Compositions received during the year		939	
	35,096				35,197
	602,021	Carried forward			633,356

BALANCE SHEET, 31st DECEMBER, 1960

1959 £	£		£	£	£
		FIXED ASSETS			
		LONDON—			
	34,131	Freehold Land (Old and New Halls) at Cost		34,131	
98,314		Old Hall Building and Equipment at Cost	98,649		
169,419		New Hall Building and Equipment at Cost	169,419		
	267,733			268,068	
		(*Note.*—The replacement of these Assets is provided for partly by means of the Rebuilding Reserve *per contra* and also by charging the cost of replacement of Equipment direct to Revenue.)			
		WISLEY—			
74,696		Freehold Land and Buildings, at Cost	74,823		
18,320		*Less* Amounts written off	18,320		
	56,376			56,503	
		Vehicles and Equipment—			
9,497		As at 31st December, 1959	9,077		
1,115		Purchased during year	570		
10,612			9,647		
1,535		Depreciation for the year	1,210		
	9,077			8,437	
	367,317				367,139
		INVESTMENTS at cost			
189,392		Representing Rebuilding and Other Reserves, as *per contra*		210,432	
72,188		General		74,952	
	261,580				285,384
		(Market Value 31st December, 1960 £259,434)			
	610	**PUBLICATIONS IN COURSE OF PRODUCTION**			1,598
		CURRENT ASSETS			
100		Botanical Magazine Stock (Nominal Value)		100	
19,354		Sundry Debtors and Payments in Advance		27,155	
6,389		Balances at Bank and Cash in Hand		9,909	
2,756		Deposit at Bank—Lindley Library Trust		2,283	
	28,599				39,447
658,106		Carried forward			693,568

1959 £	£		£	£	£
	602,021	Brought forward			633,356
		PROVISIONS			
		LONDON, MAINTENANCE OF PREMISES—			
6,506		Balance at 31st December, 1959 . .	10,465		
2,041		*Less* Expended during the year . . .	2,672		
4,465			7,793		
6,000		*Add* Transfer from Income and Expenditure Account	13,000		
	10,465			20,793	
		WISLEY, MAINTENANCE OF PLANT AND PREMISES—			
12,082		Balance at 31st December, 1959 . .	11,021		
2,661		*Less* Expended during the year . .	8,231		
10,021			2,790		
1,000		*Add Transfer from Income and Expenditure Account*			
	11,021			2,790	
		CHELSEA SHOW WORKS—			
	2,972	Balance at 31st December, 1959 . .		2,972	
	24,458				26,555
		CURRENT LIABILITIES			
3,632		SUBSCRIPTIONS IN ADVANCE		4,475	
		MEMORIAL AND OTHER TRUST FUNDS—			
3,495		Balances of Income Accounts in the hands of the Society as per Separate Schedule .		4,758	
		LINDLEY LIBRARY TRUST—			
2,756		Proceeds of Sale of Duplicate Copies less Purchases therefrom		2,283	
21,744		SUNDRY CREDITORS		22,141	
	31,627				33,657
	£658,106				£693,568

I have examined the above Balance Sheet, dated 31st December, 1960, and annexed Income explanations I have required. In my opinion such Balance Sheet and Income & Expenditure affairs and of its income and expenditure according to the best of my information and the

BALANCE SHEET, 31st DECEMBER, 1960—*cont.*

1959 £		£
658,106	Brought forward	693,568
£658,106		*£693,568*

& Expenditure Accounts for the year ended on that date and have obtained all the information and Accounts are properly drawn up so as to exhibit a true and fair view of the state of the Society's explanations given to me and as shown by the books of the Society.

F. G. FEATHER, F.C.A. *Auditor*,
(HARPER, FEATHER & PATERSON, *Chartered Accountants*),
1–4 Copthall Chambers,
Angel Court,
London, E.C.2.

13th January, 1961.

1959 £		£
85,501	ACCUMULATED FUNDS ACCOUNT	85,501
24,530	ENDOWMENT TRUST FUND	24,530
£110,031		£110,031

I have examined the books from which the above Balance Sheet is compiled and certify that of the Endowment Trust Fund is not available for use by the Society.

SHEET, 31st DECEMBER, 1960

1959 £	£		£	£
		LABORATORY, DWELLING HOUSES, GLASS HOUSES, RANGES, ETC., at Cost		
35,846		As at 31st December, 1959	35,846	
		HOSTEL AND RESTAURANT, at cost		
49,655		As at 31st December, 1959	49,655	
	85,501			85,501
		N.B.—The Hanbury Trust Estate is, under the Trust Deed, vested in the Society only so long as it is in a position to use it as an Experimental Garden. Accordingly the above Expenditure thereon by the Society is an Asset only so long as the Gardens continue to be used by the Society.		
	24,530	**ENDOWMENT TRUST FUND INVESTMENTS, at cost** (Market value at 31st December, 1960 £19,869)		24,530
	£110,031			£110,031

it exhibits a true and fair statement of the position on the 31st December, 1960. The Capital

F. G. FEATHER, F.C.A. *Auditor*,
(HARPER, FEATHER & PATERSON, *Chartered Accountants*),
1–4 Copthall Chambers,
Angel Court,
London, E.C.2.

13th January, 1961.

THE ROYAL HORTICULTURAL SOCIETY—TRUST ACCOUNTS, 31st DECEMBER, 1960

	Fund represented by Investments at Cost.	Income Balance 31st Dec. 1959	Income received during 1960	Expended in 1960	Income Balance 31st Dec. 1960
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
1 Alfred Davis Trust Fund	1,583 3 0	Nil	59 19 11	59 19 11	Nil
2 Williams Memorial Fund	216 7 5	39 17 6	8 8 4	7 10 0	40 15 10
3 Masters Memorial Fund	709 9 0	Nil	27 11 0(c)	27 11 0	Nil
4 Nicholson Memorial Fund	252 7 1	Nil	8 8 11	8 8 11	Nil
5 Schröder Pension Fund	557 14 6	Nil	20 0 0	20 0 0	Nil
6 Lindley Library Trust Fund	23,224 4 6(a)	Nil	1,475 0 10(b)	1,475 0 10	Nil
7 Sir James Knott Trust Fund	875 1 9	118 16 0	32 16 4	30 0 0	121 12 4
8 Veitch Memorial Trust Fund	1,738 11 1	226 4 9	63 9 6	22 5 6	267 8 9
9 Moore Medal Trust Fund	190 10 6	22 12 4	7 16 6	7 10 0	22 18 10
10 Sewell Medal Trust Fund	536 10 3	109 5 2	16 8 8	13 6 9	112 7 1
11 Mrs. Sherman Hoyt Prize Fund	208 1 2	35 16 5	6 4 10	12 5 0	29 16 3
12 Lord Riddell Trophy Fund	220 13 3	Nil	12 3 0(d)	12 3 0	Nil
13 The Colman Fund	1,619 18 1	Nil	55 19 3	55 19 3(e)	Nil
14 P. D. Williams Fund	372 7 9	Nil	15 10 0(f)	15 10 0	Nil
15 The Glazebrook Fund	100 0 0	Nil	3 6 3	3 6 3	Nil
16 A. J. Waley Medal Fund	131 3 10	19 0 5	3 12 8	3 10 0	19 3 1
17 Holford Medal Fund	262 17 3	23 16 9	9 18 1	8 12 6	25 2 4
18 McBean Memorial Trophy Fund	Nil	Nil	34 0 0(g)	34 0 0	Nil
19 Chittenden Memorial Fund	276 1 2	3 13 1	16 0 11(h)	16 0 0	3 14 0
20 The Mahaffy Fund	100 0 0	2 8 8	4 7 2	4 0 0	2 15 10
21 Gurney Wilson Trust Fund	23,414 3 4	2,893 1 6	1,219 9 9	Nil	4,112 11 3(i)
22 H. G. Alexander Orchid Fund	350 0 0	Nil	Nil	Nil	Nil
23 The Mrs. F. E. Rivis Prize Fund	500 0 0	Nil	Nil	Nil	Nil

Notes	£ s. d.
(a) Investment	1,509 1 2
Costs of books purchased by Society	19,955 2 1
Books purchased out of proceeds of sales of duplicate vols.	1,760 1 3
	£23,224 4 6

(b) Includes contribution by the Society £1,444 2s. 6d.
(c) Includes contribution by the Society £7 3s. 6d.
(d) Includes contribution by the Society £4 7s. 4d.
(e) Income re-invested.
(f) Includes contribution by the Society £4 10s. 7d.
(g) Includes £29 8s 3d. from Capital.
(h) Includes £5 from Worshipful Company of Gardeners
(i) Income reserved to defray the ultimate cost to the Society of the Third World Orchid Conference.

Total as per Balance Sheet £4,758 5 7

Notes on above Funds:

1. Bequeathed to the Society in 1870 for annual prizes or any other object the Council may determine. 2. Raised by donations in 1891 in memory of the late Mr. B. S. Williams towards the provision of prizes and medals. 3. Raised by donations in 1908 in memory of the late Dr. Masters towards the provision of one or more annual lectures. 4. Raised by donations in 1908 in memory of the late Mr. George Nicholson to provide prizes for Wisley students. 5. Provided by the Society in memory of the late Baron Schröder to pay to the Gardeners' Royal Benevolent Institution for one pension. 6. The nucleus of the library is the fine collection of books and pamphlets which belonged to the late Dr. Lindley. It has since been added to by the books purchased by the Society and by the gifts of the late Mr. Reginald Cory and others. 7. Presented to the Society in 1920 by the late Sir James Knott for the purpose of providing a scholarship. 8. Instituted in 1870 in commemoration of the late Mr. James Veitch for the encouragement of Horticulture. Fund vested in the Society in 1922. 9. Presented to the Society in 1926 by the late Mr. G. F. Moore to provide a medal annually for the Cyrtopedium which shows the greatest improvement on those of the same or similar parentage shown to the Society during the year. 10. Presented to the Society in 1928 by the late Mr. A. J. Sewell to provide medals for Rock Garden Plants. 11. Presented by Mrs. A. Sherman Hoyt in 1920 as a donation and funded by the Society to provide prizes for the encouragement of the growth of Cacti and Succulents. 12. Presented by the late Lord Riddell in 1931 to provide a trophy annually to be awarded for vegetables. 13. Presented to the Society in 1935 by the late Sir Jeremiah Colman, Bt., V.M.H., to be used for the improvement of flowers or fruit. 14. Raised in 1936 by donations to provide medals to commemorate the late Mr. P. D. Williams and to encourage the cultivation and improvement of Daffodils and Rhododendrons. 15. Bequeathed to the Society in 1938 by the late Mr. H. de T. Glazebrook to provide prizes at the Society's shows. 16. Instituted by Mr. Alfred J. Waley in 1937 to provide an annual award to any working gardener who has helped the cultivation of Rhododendrons. Fund vested in the Society in 1946. 17. Presented in 1947 by the Trustees of the late Sir George Holford to perpetuate the Holford Medal, offered since 1928 for the best exhibit of plants and or flowers (excluding fruit or vegetables) shown by an amateur during the year. 18. Presented in 1947 by the family and friends of the late Mr. A. A. McBean, to provide a Silver Trophy annually from 1949, over as long a period as the sum shall last, for the best exhibit of Cymbidiums shown by an amateur. 19. Capital contributed by The Royal Horticultural Society, the Horticultural Education Association and the Wisley Gardens Club in 1952 to provide an income for the award of "The Chittenden Memorial Prize" to the top candidate in Section 1 (General Horticulture) in the final of the N.D.H. examination and a "Chittenden Award" to the top candidate in the N.D.H. preliminary examination and the top candidate in the Wisley Diploma examination. 20. Capital presented to the Society in 1955 by Miss P. Penn Gaskell to endow a fund in memory of the late Miss Kathleen Louise Mahaffy to provide prizes for the Fruit and Vegetable Competition. 21. Capital bequeathed by the late Mr. Gurney Wilson to constitute a Trust Fund the income of which is to be used for furthering the horticultural work of the Society as the Council deem fit. 22. Capital presented in 1960 by Mr. H. G. Alexander to provide a "Westonbirt Orchid Medal" annually to encourage the breeding and exhibition of orchids, and to recognise other outstanding achievements in connexion with orchids. 23. Capital presented in 1960 by Miss A. K. Hincks in memory of her sister, Mrs. F. E. Rivis, to establish a fund to encourage excellence in cultivation.

JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY

VOL. LXXXVI PART TWO

FEBRUARY 1961

THE SECRETARY'S PAGE

ANNOUNCEMENTS—FEBRUARY AND MARCH

Annual General Meeting—The Annual General Meeting to receive the Report of the Council for 1960 and a statement of accounts for that year will be held on Tuesday, February 28, 1961, at 3 P.M. The Meeting will be held in the Old Hall in order that there may be ample room for all who wish to attend. It is hoped that as many Fellows as possible will be present.

Shows

TUESDAY, February 14 12 NOON to 6 P.M. WEDNESDAY, February 15 10 A.M. to 5 P.M.	Fortnightly Flower Show and Ornamental Plant Competition, in the New Hall.
TUESDAY, February 28 12 NOON to 6 P.M. WEDNESDAY, March 1 10 A.M. to 5 P.M.	Fortnightly Flower Show, in the New Hall. Annual General Meeting at 3 P.M. on February 28, in the Old Hall.
TUESDAY, March 14 12 NOON to 6 P.M. WEDNESDAY, March 15 10 A.M. to 5 P.M.	Fortnightly Flower Show, Ornamental Plant Competition, Rhododendron Competition and Alpine Garden Society's Competition, in the New Hall. British Orchid Growers' Association's Show, in the Old Hall.

TUESDAY, March 28
12 NOON to 6 P.M.
WEDNESDAY, March 29
10 A.M. to 5 P.M.
} Fortnightly Flower Show and Daffodil Competition, in the New Hall.

Lectures

TUESDAY, February 14, at 3 P.M. "Plants at Inshriach", by MR. J. DRAKE.
TUESDAY, March 14, at 3 P.M. "The Culture of Orchid Species", by MR. G. L. HEY, M.A.
TUESDAY, March 28, at 3 P.M. "Alpine Plants", by MISS V. FINNIS.

Demonstrations at Wisley—The following demonstrations will be given at Wisley, those on the succeeding days being in each case repetitions of that given on the first.

February 22–24.	Pruning of Roses. (Commencing at 2 P.M.)
March 1–2.	Seed Sowing and Vegetative Propagation of Alpines. (Commencing at 2 P.M.)
March 15–16.	Pests and Diseases of Fruit Trees; Recognition and Methods of Control. (Commencing at 2 P.M.)

Winter-flowering Plant Competition—In order to bring to the notice of Fellows some of the plants which bloom in the open during the winter and early spring, three competitions for ornamental plants grown in the open by amateurs have been arranged for the first three months of 1961. One was held on January 24 and 25, another is to be held on February 14 and 15 and the third on March 14 and 15.

Rhododendron Competition—The annual Rhododendron Competition will be held in conjunction with the Fortnightly Show on March 14 and 15.

Daffodil Competition—The annual Daffodil Competition, intended for those who live in early districts, will be held at the Fortnightly Show on March 28 and 29.

Schedules for the above-mentioned Competitions may be obtained from the Secretary.

The Fruit Group—The Fruit Group consists of Fellows and Associates of The Royal Horticultural Society who are especially interested in the extension and improvement of the cultivation of fruit in private gardens. Its primary object is to provide Members with facilities for meeting periodically for lectures, discussion and visits to research stations, private gardens, etc. Membership is open to all Fellows and Associates without additional subscription. Those who wish to join should apply in writing to the Secretary.

The Third International Rock Garden Plant Conference—This Conference, which is being arranged jointly by The Alpine Garden Society and The Scottish Rock Garden Club, will be held in London and Edinburgh from April 18 to April 28.

The Alpine Garden Society's Conference opens in London on April 18 and in addition to the series of lectures, and a Conference Dinner, excursions will be made to Wisley, Kew, Windsor Great Park and the University Botanic Garden, Cambridge.

The Scottish part of the Conference opens in Edinburgh on April 24 and the programme will include a series of papers, a Conference Luncheon and visits to the gardens at Keillour Castle, Methven and Branklyn, Perth. A Reception will be given by the City and Royal Burgh of Edinburgh in the evening of April 24.

Exhibitions of alpine and rock-garden plants and shrubs arranged in connexion with the Conference will be staged in the New Hall, Greycoat Street, Westminster, on April 18 and 19, and in The Music Hall, George Street, Edinburgh, on April 25, 26 and 27.

Conference Programmes, price 6*d*., may be obtained from the Secretaries of the Societies, at the following addresses:

C. B. Saunders, Esq., Secretary, The Alpine Garden Society, Husseys, Green Street Green, Farnborough, Kent.

Sqdn.-Ldr. J. J. Boyd-Harvey, Hon. Secretary, The Scottish Rock Garden Club, Boonslie, Dirleton, E. Lothian.

PLANNING AND PLANTS FOR THE SMALL GARDEN

Part II

David Wright

In the first part of this essay, I outlined some basic principles of design and planting, then went on to describe how the person with one acre or even considerably less might "Do Capability Brown over again in miniature", and have a garden involving far less upkeep than the usual lawn framed by borders.

In the second part, I propose to show how, with patience but without undue difficulty or expense, a small woodland garden can be created out of a non-woodland site.

Finally, I shall recommend as a third alternative, a revival of the traditional cottage garden system of beds and paths in which the use of colour and form is more sophisticated than commonly associated with such schemes.

(*b*) THE MINIATURE WOOD

Although a wood is clearly a very different concept from a park, nevertheless in practice the park could easily be transformed into a wood through thickening the planting of trees until they were about as far apart as trees in an orchard.

It is obvious that a wood, started from scratch is a much longer term policy than a more open park-like plantation. But the result can be well worth waiting for, as under the shade-giving, frost-preventing canopy of branches thus created, could be grown choice rhododendrons, camellias and magnolias, which would largely be a failure on an open site.

These plants, along with enkianthus species, pieris, clethras and eucryphias (all, incidentally, lime-hating) like, not dense shade, but the dappled sunlight provided by a light canopy of tree branches.

The sort of trees to use would be cherries, maples, rowans and whitebeams, the tree-like cornels (*Cornus kousa*, *C. nuttallii* and *C. controversa*), the camellia-like stewartias, snowdrop trees (especially *Styrax japonica* and *Halesia monticola* (Fig. 15)), none of which grow too large and most of which have more than one feature of attraction.

For instance, cherries give flowers in spring and coloured leaves in autumn, acers (especially the Snakebark group) give lovely striated trunks, decorative twigs, interesting leaf shapes and autumn colour. Sorbus give beautifully shaped, and in autumn coloured leaves.

When considering magnolias, do not plant only spring-flowering kinds as these, however lovely, often get frosted; try also the summer flowering, cup-shaped, beetroot-stamened *M. sinensis*, *wilsonii*, *sieboldii* and *watsonii*.

In the case of camellias, far more use should be made of the single-flowered *C. saluenensis* and its hybrids—'Cornish Snow', 'J. C. Williams' and 'Mary Christian', also the single-flowered japonica types—'Alba Simplex', 'Jupiter' and 'Fleur de Pêche', which look far more at home in a woodland setting than the rather artificial doubles. The latter are better suited to the north wall of a house, or near some sort of stonework, preferably grey.

Rhododendrons are probably the finest shrubs that can be grown in lime-free soil, and a far greater range can be managed under a canopy of tree branches, always remembering that except for the very large-leafed kinds, they like dappled, not dense shade.

Regarding colour, I would put in a plea for soft-pedalling on the pinks and reds, and would make far more use of the pale creamy yellows and apricots: e.g. 'Yellowhammer', 'Letty Edwards', 'Damaris', 'Hawk', and 'Chaste' among the yellows, 'Lady Chamberlain', 'Alison Johnstone' and 'Fabia' among the apricots.

These remarks also apply to the blue-violets, *R. augustinii* and its hybrids, 'Blue Tit', Blue Bird' and 'Blue Diamond', and the hardy medium-sized whites, *yunnanense*, *aberconwayi* and *caeruleum album* (the last named especially beautiful with blue-grey waxy leaves).

In the same botanical group (or subseries) as *R. caeruleum album* comes *R. oreotrephes*† with flowers of a subtle grey-mauve and glaucous foliage, and worthy of much more frequent planting in the small garden.

† Needs shelter from cold winds.

These whites, "blues" and mauves, apart from *augustinii*, will stand a good deal of sun, and will not flower freely in too deep shade. The manner in which they are planted in the Savill Gardens, Windsor Great Park, provides a superb object lesson which should be seen by everyone who is interested in this subject.

As for the Azalea group, I should like to see the balance restored in favour of the species and near-species, as distinct from the garden hybrids.

There should be much more planting of such azaleas as the pale pink *vaseyi* and *schlippenbachii* and the purplish pink *reticulatum* (always providing of course, that there is reasonable protection from frost and cold wind).

The chaste and delicate *R. mucronatum* (formerly known as *Azalea ledifolia*) with white, green-throated flowers and soft moss-green leaves, should be in every lime-free garden. The lilac-flowered form, *lilacinum*, and the pink-flushed form, var. *noordtianum*, are also very desirable. The fierce magenta-crimson *R. amoenum coccineum* can look well, isolated in shade, underplanted with bluebells.

It seems that when people find they can grow azaleas, there is an almost irresistible temptation to indulge in an unrestrained orgy of planting, resulting in clotted masses of oranges, salmons and scarlets. Rhododendrons and azaleas are, broadly speaking, the most colourful and exciting shrubs that can be grown outside in Britain, but for this very reason they need to be used with greater discrimination and restraint than any other plants—except perhaps dahlias and florists' gladioli!

Finally, always spare a space for a plant or two of the late-flowering and intensely fragrant, white *R. viscosum* and *R. arborescens*—both very hardy.

A woodland area in summer and autumn can be enlivened by the lace-cap hydrangeas, especially *H. serrata acuminata* 'Blue Bird', which are so much more attractive and suitable than the mop-heads which, as MISS VICTORIA SACKVILLE-WEST has rightly said, remind one of grand hotels and fashionable race-courses!

There would be no need to dig up the whole area under the trees. The object would not be to have beds of shrubs, but rather to plant individuals here and there. These would only need small beds, 3 feet in diameter, and 2 feet deep, into which plenty of organic matter such as peat or leaf-mould (preferably oak) should be worked during their preparation.

Such a planting of rhododendrons, camellias and magnolias, under a light canopy of small trees (cherries, maples, rowans and birches) would be very satisfying in itself, but if felt to be incomplete, could be supplemented by underplantings of bulbs and ground covering herbaceous plants.

Apart from the usual snowdrops, scillas and chionodoxas—lovely as these undoubtedly are—there could be Dog-Tooth violets (erythroniums and the smaller daffodils, such as *Narcissus cyclamineus*, 'W. P.

Milner', 'February Gold', the various forms of the wild English *N. pseudo-narcissus* and the fragrant May-flowering Jonquils, especially *N. odorus rugulosus*; then to round off the spring, the old-fashioned but serviceable Pheasant's Eye—*N. poeticus recurvus*.

If, like some people, you cannot bear hydrangeas, summer in a woodland garden can be made interesting with lilies. If you like hot orange shades, there are no end of species and varieties to choose from (and none finer than the Bellingham hybrids for July, and the varieties of *Lilium tigrinum* for August and September), but, personally, I think there is nothing so effective in dappled shade as white lilies. Easiest to grow and not far from being the loveliest, is *L. regale*. These should be drifted and grouped if possible, in the same manner as spring bulbs or daffodils.

Cyclamen colonized round tree boles will give colour in late August, September, October and again in March or earlier (see the varieties mentioned in the previous section).

As for herbaceous coverage, what could be better to start the year than the English primrose? (Remembering to give it plenty of humus if the soil is light and sandy!) Then the blue-flowered *Omphalodes verna* and *Brunnera macrophylla*, (the latter with superb large cordate leaves) could follow, along with hellebores, both the Lenten Hybrids in shades of greenish pink and greenish mauve, and the native green-flowered *H. viridis* and *H. foetidus*.

Much use could profitably be made of green or greenish flowers in such a setting. All the plants mentioned for the shady beds in the last section could also be used, especially the geraniums which in this case could include the more vigorous kinds such as *G. phaeum*, *G. sylvaticum* and var. *album*, *G. endressii* and *G. macrorhizum*.

The so-called "Japanese" anemones (varieties of *Anemone hupehensis*) pink and white, look very lovely in half shade in autumn; in fact, these plants, along with *Cyclamen neapolitanum* and willow gentian,† could be relied upon effectively to close the flower season in a woodland area where hydrangeas are not grown.

If your soil is limy, fine shade-tolerating evergreens are the mahonias. Apart from *M. japonica*, already mentioned, there are *M. japonica* var. *bealei*, with the same fragrant pale yellow flowers, but with erect, not horizontal flower spikes, and flowering in March, whereas *japonica* itself starts to flower in late November.

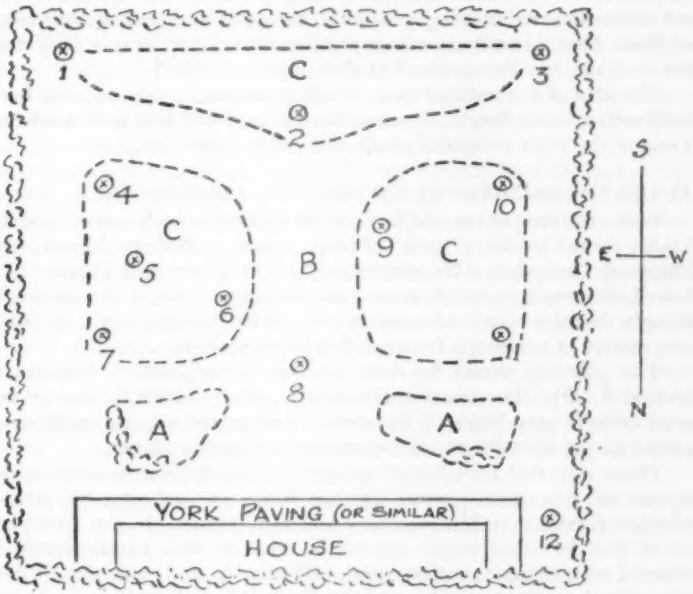
Also November-flowering is the magnificent *M. lomariifolia*, with leaves like that of some gigantic fern (the specific name is very appropriate!) and big hyacinth-like spikes of rich daffodil yellow. But this definitely needs protection from cold winds and from more than, say, 15 degrees of frost.

Add to these, the ground-covering *M. aquifolium* (ubiquitous, but highly serviceable!) and *M. nervosa*, the erect-growing *M. aquifolium* var. *undulata* and *M. pinnata*, and you have a very nice small collection

† *Gentiana asclepiadea.*

of lime-tolerating evergreens; the only drawback being that they all have yellow flowers.

This is perhaps the point at which to put in a good word for a prostrate form of laurel, all too rarely seen—*Prunus laurocerasus* var. *zabelliana*—an admirable ground-covering evergreen shrub for shady places.



Plan of Semi-formal "Grid" Beds and Paths

KEY

1. *Prunus* (cherry) *yedoensis* (April-flowering—white)
2. *Acer griseum* ("chocolate bark" maple)
3. *Prunus serrula thibetica* ("mahogany bark" cherry)
4. *Elaeagnus macrophylla* (silver-leafed—evergreen)
5. *Leptospermum lanigerum* (grey-leafed—evergreen)
6. *Genista cinerea* (fragrant yellow broom)
7. *Juniperus hibernica* (Irish juniper; blue-grey pencil)
8. *Koelreuteria paniculata* (slim tree; ferny foliage)
9. *Cornus controversa* (red-twigged tree)
10. *Sorbus sargentiana* (mountain ash, with striking leaf)
11. *Magnolia* Soulangeana × 'Alba Superba' (large white-scented flowers)
12. *Malus tschonoskii* (crab with pyramidal habit)

A. Rock outcrops (limestone, sandstone or granite according to the district) with alpines and very low shrubs.
B. Gravel paths with thymes, etc., or mown grass.
C. Open shrub planting with low growing herbaceous plants in between.

Pre-eminent among *deciduous* shrubs that will tolerate a limy soil and semi-woodland conditions, are *Philadelphus* and *Deutzia*.

These have already been mentioned, but it is surprising how rarely one sees the best of them in use, namely, of *Philadelphus—delavayi* (especially 'Nymans' form'),† 'Belle Etoile', 'Sybille', 'Beauclerk' (Fig. 14), 'Lemoinei Erectus', *microphyllus*, 'Coupe d'Argent', and of *Deutzia*—the pink-flowered 'Rosea Carminea', 'Elegantissima' and 'Kalmiaeflora', and white-flowered *monbeigii*, *sieboldii*, *compacta* and *setchuenensis corymbiflora*. *Deutzia setchuenensis corymbiflora* is as lovely as it is neglected, and in shade, can last as much as six weeks in flower.‡

The idea of a woodland area, whether natural or artificial, has been dealt with at some length, because there is no doubt that such a scheme is one of the most delightful of all, if it can be achieved.

(*c*) THE FORMAL GRID OF INFORMALLY PLANTED BEDS

When the size, shape and level of the ground is such as to demand a frankly *formal* layout, a "grid" of beds such as at Hidcote Manor, near Chipping Campden, Gloucestershire, or at Tintinhull House, near Yeovil, Somerset, is worth serious consideration. But it should not be thought that this means advocating a return to "bedding out". It would be a matter of creating a framework for free planting.

The planting would be done on the "layer" system outlined in Section I, (8). To rehearse this briefly, there would be one or two small trees to give height, a *few* shrubs *well-spaced out*, and underneath a solid carpet of bulbs and low-growing herbaceous plants.

Please note that the ultimate aim would be to have *no bare soil*, which is one of the most vicious characteristics of orthodox gardening, whether formal or informal. Bare soil is unnatural, in the first place (areas that for some reason cannot be covered with plants should be covered with organic matter—peat, leaf-mould, etc.), secondly, it *looks* dismal in the winter months, and thirdly, it is is an invitation to the free growth of weeds.

Unlike the "park", or "wood", where one would try and melt the whole scheme into the landscape, this would be framed by a hedge—holly, yew, beech, or hornbeam—or by a screen of "Lawsons" (*Chamaecyparis lawsoniana*) or *Thuja plicata fastigiata*. In the beds nearest the house, there would only be very low-growing plants, and if some rock was available—whether limestone or sandstone—the flatness of this part of the site could be offset by making the beds into rock outcrops.

Here could be planted low, compact heathers (varieties of *Erica carnea*, *cinerea* or *tetralix*), brooms such as *Cytisus kewensis*, *ardoinii*, *purpureus* and *hirsutus demissus*, and rock roses (*Helianthemum*, *Halimium* and *Halimiocistus*); shrubby potentillas like *arbuscula*, *farreri*, and *mandschurica*; dwarf hebes (the shrubby veronicas) such as *lindsayi*,

† Now to be known as *P.* 'Purpurascens'.

‡ Another beautiful July–August flowering kind in *Deutzia chunii*, with white bell-shaped drooping flowers, flushed pink, and with grey willow-like leaves.

pageana, *albicans*, 'Bowles' Hybrid', *buchananii* and *pimelioides*. Also try *Fabiana imbricata prostrata* which is much hardier than the type, and forms a lovely mass of vivid green.

On the upper half of the slopes, there would be an opportunity for planting a few of the more vigorous alpines, which otherwise tend to be omitted altogether from the small, modern, labour-free garden. There could be *Daphne cneorum* and *D. arbuscula*, prostrate shrublets like *Genista pilosa procumbens*, *sagittalis* and *delphinensis*; *Aethionema* 'Warley Rose'; very small conifers such as *Juniperus communis compressa*, *J. c.* 'Hornibrookii and *J. c.* 'Echiniformis'; *Veronica rupestris*; dwarf geraniums, notably *dalmaticum*, *lancastriense* and *subcaulescens*; *Gentiana verna* and *G. acaulis* (especially var. *clusii* and var. *coelestina*); pulsatillas, and *Anemone blanda* (especially var. *atrocoerulea*).

In the vertical crevices created by the outcropping rocks, a home could be found for the bolder varieties of encrusted saxifraga and sempervivum; and this too would be the best site for dianthus and many campanulas.

Of two beds in the middle of the garden, the one on the left, might be a scheme in silvers, greys, whites, blues and the paler yellows; the silvery greys being supplied, for instance, by the evergreen shrubs *Senecio laxifolius*, *Elaeagnus macrophylla*, *Leptospermum lanigerum*, grey-greens by rosemary and *Genista cinerea* (canary-yellow, scented flowers in June and July), blue-greys by *Juniperus communis* var. *hibernica* (Irish Juniper), *Ruta graveolens* 'Jackman's Blue', *Lavandula* 'Hidcote Purple' (*spica nana atropurpurea*) and *Caryopteris clandonensis* (especially the new form named 'Heavenly Blue').

The Lavender would give a rich dusky purple throughout a large part of the summer, and the caryopteris, aster-violet flowers in August and September.

The neat upright bushes of *Philadelphus* 'Lemoinei Erectus' would give white-scented flowers at the same time as the genista, and the pale powder blue of *Ceanothus* 'Gloire de Versailles', flowering all through the late summer and autumn would look lovely against the silvery greys of the elaeagnus and leptospermum. *Ceratostigma willmottianum* could be added to give a rich gentian blue during the same period.

The herbaceous element would be provided by bearded irises of which the four ancestral species are, to my mind, still the best in many ways, i.e. *Iris germanica* (purple), *I. pallida dalmatica* (pale blue-lavender, and with superb large grey sword-like leaves), *I. flavescens* (pale creamy yellow) and *I. florentina* (grey-white).

Good grey-foliaged ground-covering plants would be *Anaphalis triplinervis* and *Stachys lanata* (Lamb's Ears) (Fig. 17).

The linear, vertical quality of the irises could be repeated in late summer by clumps of the hardy *Agapanthus africanus* (*A. umbellatus mooreanus*), both blue and white, also the lovely grey-leafed, white bell-flowered *Galtonia candicans*.

In the bed opposite to this, the same principle would be applied, i.e.

there would be one or two well-spaced vigorous shrubs or small trees, and self-maintaining herbaceous plants in between. But here the prevailing colours would be greens rather than greys, yellow inclining to gold, darker blues, and even some strong reds or orange reds.

The three *trees* could be *Sorbus sargentiana*, a mountain ash with sticky red-brown buds and enormous pinnate leaves, huge creamy corymbs of flowers and scarlet berries in autumn; *Cornus controversa*, a small tree with tabular branches and dark red-wine twigs, bearing blue berries after a hot summer; and a magnolia, either *M.* Soulangeana 'Alba Superba', if a bushy one was wanted, or *M. loebneri* (*stellata* × *kobus*) for a small tree, both with white flowers.

Shrubs giving rich yellow flowers, in the spring could be *Forsythia intermedia spectabilis*, ubiquitous but first-rate, and *F. suspensa atrocaulis*, flowering a little later with paler, more lemony flowers and, black-purple stems, and, for evergreens, the mahonias mentioned in the last Section could be used.

Two or three plants of *Fothergilla monticola* (providing the soil is not too limy) with their greenish cream bottle brushes would tone down the rather acid yellows of the mahonias, and their leaves die off in glorious shades of yellow and scarlet in the autumn.†

To carry on this strong yellow colouring there could be *Paeonia lutea* var. *ludlowii* in June, and two or more *Hypericum patulum* 'Hidcote'—the finest of hardy St. John's Worts—to flower from July until the autumn. In the vicinity of the fothergillas, but not next to one of the strong yellows, one of the Japanese quinces or chaenomeles, say 'Knaphill Scarlet' would make an effective highlight. C. 'Simonii' and C. 'Aurora' have rich velvety colours too.

A very distinguished shrub to follow the forsythias, mahonias and fothergillas, and to precede hypericums is the May-flowering *Rubus* 'Tridel' (*R. deliciosus* × *R. trilobus*), with flowers like large white anemones, pale green crinkly leaves and orange-brown stems. This could fit into such a scheme of yellows and greens (Fig. 13).

There is a fascinating, but neglected range among herbaceous plants with yellow-green flowers, the majestic 3–4 feet high Spurges, *Euphorbia characias* and *E. wulfenii* (Fig. 12) (*E. sikkimensis*, also has bright red stems and leaves in early spring), the hellebores, especially *corsicus*, *viridis*, and *foetidus*, the lowly *epimediums*, ground-covering relatives of the Barberries, and Lady's Mantle (*Alchemilla mollis*) with its rounded hairy leaves and feathery greeny yellow flowers. The varieties of *Iris sibirica* (although they have a reputation for being waterside plants, are quite happy in any humus-filled soil) would give the vertical touch necessary to most compositions and their shades of indigo, cobalt and azure could effectively neighbour the yellow of *Paeonia lutea* var. *ludlowii*.

† A delightful and unusual combination recently noted was the pale yellow *Corylopsis pauciflora* next door to the white *Osmanthus delavayi*. In the same vein, might be tried Rhododendron 'Yellowhammer' and *Skimmia foremanii*, underplanted with primroses.

Room should be found for a clump or two of the fragrant lily-like hemerocallis (Day Lilies) particularly the citron yellow 'Hyperion'—the individual flowers are fleeting, but they keep on coming over a long period; moreover the young foliage piercing through the soil is a curious white–yellow–green—very congruous with the other colours of the same season.

Finally, for autumn effect, plant a few kniphofias (Red-hot Pokers), not the usual rather coarse, *K. uvaria*, but the refined *K. galpinii* (apricot-orange), *K. nelsonii* (orange-red) and the rare *K. northiae*, which is a subtle greeny yellow. These three species grow about 2 feet high and are generally more suitable for the small garden than *K. uvaria*, or Common Red-hot Poker.

These would combine effectively with the indigo-coloured flowers of the Monkshoods, *Aconitum napellus: A. wilsonii*, and *A. fischeri* which flower at the same time.

Finally, at the far end of the garden, facing the house (see Text Fig. 2), there would be a long rectangular or narrowly elliptical bed, flanked by two small trees, say, *Prunus yedoensis* (Fig. 22) and *P. serrula tibetica* (surely one of the half-dozen most beautifully barked trees of the Temperate regions!), and having a third small tree—*Acer griseum*†—as its centre-piece (Fig. 23).

Providing that the soil was lime free, near the edges could be small groups of dwarf rhododendrons—always attractive as evergreens, quite apart from their floral beauty. R. 'Blue Tit', 'Blue Diamond' and *racemosum* in one or other of its forms, are all fairly hardy in normal open conditions, and planted together or near each other would make a pleasant harmony of blue-violet and soft pink. 'Blue Tit', however, usually flowers earlier than 'Blue Diamond' and is paler in tone.

If the site was reasonably free from frosts and cold winds, there could be a plant or two of the early flowering dwarf rhododendrons, such as *R.* × *praecox* (mauve pink), R. 'Bric-à-Brac' (creamy white) and R. × 'Cilpinense' (white, flushed and freckled with pink).

As the other two beds would have been devoted largely to yellows, whites and blues, this bed could mainly consist of mauves, violets, pinks and pinkish purples.

With this object in view there could be the pinkish mauve forms of the Lenten hellebores, the grey mauves of Plantain lilies (hostas), especially *H. sieboldiana* and *H. fortunei*, both with superb large heart-shaped leaves—blue-grey in the case of *sieboldiana*, the various geranium species mentioned in Section II, (*a*) and (*b*), forms of *Anemone hupehensis* and its hybrids. (These if possible, should be planted in the shade of the trees.)

Here, or in one of the other beds, according to their colour, a prominent position should be given to the paeonia species. Their single flowers are more appropriate in a naturalistic and more or less informal garden than the large, floppy double ones of the Chinese hybrids,

† This also has an exquisitely beautiful cinnamon-coloured bark.

beautiful as these are; also, the plants are far less likely to need stakes. Finally, they have beautiful seed (purple-black) in scarlet-lined pods.

Here is a short list of them in possible order of attractiveness: ***Paeonia mlokosewitschii***, palest citron, glaucous leaf; *P. wittmanniana*, cream; *P. obovata alba*, white, very good seed pods; *P. emodi*, white, tall growing; *P. woodwardii*, small pink flowers; *P. corallina* (*lobata*), sealing-wax scarlet.

Through all this carpet of vegetation, different bulbs could be interwoven in the scheme, beginning with crocus species on the rocky outcrops near the house (special attention should be paid to *C. imperati*, *biflorus* and its varieties, *sieberi*, and perhaps above all the garden forms of *C. chrysanthus* raised by the late E. A. BOWLES. These forms have very elegantly shaped "waisted" flowers. Especially attractive are 'Canary Bird', 'E. A. Bowles', 'E. P. Bowles', 'Moonlight', 'Snow Bunting' and 'Blue Bonnet').

Small narcissi, like *bulbocodium* and *cyclamineus*, are lovely too, so long as the soil is not too light and dry. Among the shrubs in the other beds, should be tried some of the *Narcissus triandrus* (Angel's Tears) or the hybrids of which ALEC GRAY has raised many.

In great quantity, almost everywhere, I should like to see the aster-violet *Crocus speciosus* in one or other of its forms, flowering in September and October, and giving a tremendous floral interest to the garden at a time when this is definitely on the wane.—An incredibly neglected plant considering its great beauty and ease of growth!

In the bed with the yellow-flowered shrubs, try the bright yellow Dog-Tooth Violet, *Erythronium tuolumnense*. Also, when planting snowdrops, give some thought to one or two of the larger kinds, notably the magnificent *Galanthus elwesii* and *G. nivalis* 'Atkinsii.'

Of course, none of the schemes that have been outlined are anything like exhaustively dealt with. The aim is simply to offer suggestions which shall be a point of departure from the usual kinds of layout and an incitement to experimenting with the colours and forms of plants.

MASTERS MEMORIAL LECTURE, 1960

INSECTS AND HORTICULTURE

Professor H. W. Miles, D.Sc., Ph.D.

(*Lecture given on October* 25, 1960. H. V. TAYLOR, C.B.E., D.SC., V.M.H., *in the Chair*)

PART II

THE CHAIRMAN: It is a pleasure to have with us again PROFESSOR MILES of Wye College, to give the second part of his Masters' Memorial Lecture on "Insects and Horticulture". The first part was given a fortnight ago when he dealt mainly with insects on fruit trees.

PROFESSOR MILES: In my first lecture I compared the position in regard to the control of insects and other pests in fruit plantations at the time of PROFESSOR THEOBALD's lecture to the Society in 1928 with the position today, and suggested that although we now have more potent insecticides and acaricides and greatly improved machinery for their application, today's problems are more intricate and baffling than those that faced our predecessors. Some indication of the complexity of the modern problems can be seen by comparing the numbers of research workers of all grades at our two major fruit research stations in 1928 and in 1959, East Malling has increased from 28 to 128 and Long Ashton from 32 to 118.

The work within the subject sections at these research stations is highly specialized, and advances in knowledge in one department profoundly affect developments in another. The plant breeder concerned primarily with improving the quality or extending the period of usefulness of a variety also takes into account the plant's inherent ability to tolerate diseases and pests when making his crosses or selections. Equally the work of the plant physiologist may well throw light on some problem of insect behaviour, and workers in every subject make use of statistical methods in the interpretation of their observations and experiments. Three subjects that, in their applied aspects, are drawn most strongly together by their community of interest are entomology, plant pathology and plant nutrition, and workers in these subjects have everything to gain from frequent consultation in field and laboratory (4).

Vegetable-growing has only recently received full research attention and it was not until 1949 that the National Vegetable Research Station was established at Wellesbourne, near Warwick. To some extent the neglect of vegetable culture was associated with the geographical distribution of large-scale market gardening (5). Fruit-growing was mainly located in the south-eastern and the western counties and its concentration in only two localities enabled growers to co-operate financially on the launching of research programmes at Long Ashton (1903) and East Malling (1913). Vegetable growing was distributed over the country where soil and climate were suitable. There were considerable areas devoted to market-garden crops in the eastern counties, the south-west, parts of Worcestershire and on the peaty soils of Lancashire, and there were concentrations near many large towns. The holdings were generally rather small and because most of the cultivation was done by hand labour (6) there was little capital investment and little incentive to organize. Pest problems tended to be similar in all parts of the country and members of the county and provincial services carried out experiments and demonstrations of control measures against troublesome insects and eelworms. THEOBALD (13) referred to the use of bran and Paris green as a poisoned bait against cutworms and leatherjackets, and to the use of calcium cyanide as a soil fumigant against wireworms.

In the interwar years when large-scale vegetable-growing was becoming a major feature of the agricultural pattern of the Eastern counties and when the importance of eelworms as disease-producing agents was being increasingly realized, F. R. PETHERBRIDGE and his colleagues at the School of Agriculture, Cambridge, were greatly interested in the pests of market-garden crops. The hand operations used in the cultivation of vegetables made the crops expensive to grow, but had the advantage of keeping growers sensitive to the condition and fertility of the soil, the rate of development of the plants, the effects of weather on their health and vigour, and the influence of all these factors in the environment on the occurrence of injurious insects and on the degree of crop loss they caused. The economy of the holdings was generally such that control measures had to be cheap and be capable of application by simple hand-operated tools, and whenever possible cultural practice was modified so that it might serve two purposes, one to assist the crop plants and the other to make the environment less favourable for the insect pests.

SOME PESTS OF BRASSICAS

Brassicas have for long occupied a predominant place among our vegetable crops. Seed-sowing begins in February and continues to early summer; transplanting begins in early April, and where a good succession of crops is maintained, it proceeds at intervals until August. Flea-beetle attack in seed-beds, and cabbage fly attack on newly set plants, are the main hazards, though other pests such as stem weevil (*Ceutorrhychus quadridens* Panz.), gall weevil (C. *pleurostigma* Marsh), the leaf and stem miner (*Phytomyza rufipes* Meig.), mealy cabbage aphis (*Brevicoryne brassicae* L.), cutworms, and caterpillars of cabbage butterflies and the garden pebble moth (*Pionea forficalis* L.) may be of importance in some seasons. In 1930 and onwards until as late as 1945 the measures recommended for flea-beetle control were early sowing, rolling the soil to prevent the beetles reaching the germinating seeds, and the use of deterrents as seed-dressings or dusts (10). None of these treatments could be relied upon to give adequate protection in dry weather and re-seeding was often necessary. Now the use of BHC in the form of a lindane seed-dressing, together with the increased use of irrigation for seed-beds has almost eliminated loss from flea-beetle attack.

The cabbage root fly (*Chortophila brassicae* Bché) was then undoubtedly the most serious pest of brassica crops because its attacks took place after all the major costs of growing summer cabbages and cauliflowers had been incurred, and it was not uncommon to see large areas of well-grown plants wilting in the hot sunshine of late May and early June as a result of the feeding of large numbers of maggots at their roots. So heavy were the losses in Essex and other eastern counties during a succession of dry springs that growers were forced to consider changing their cropping systems. The measures recommended to combat this pest were the use of chemical deterrents such as creosote and

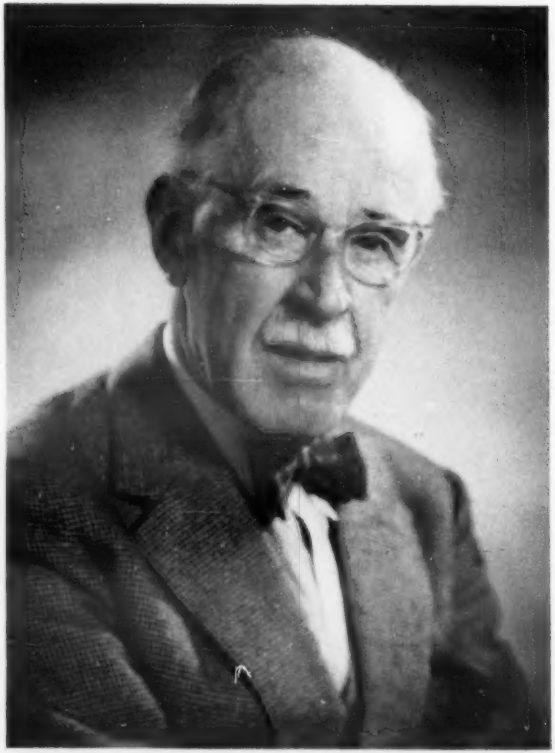


FIG. 20—MR. G. L. PILKINGTON

Photo: Colin G. Futcher

FIG. 21—MR. L. MAURICE MASON

Photos: J. E. Downward

PLANNING AND PLANTS FOR THE SMALL GARDEN

FIGS. 22 and 23—(*left*) *Prunus yedoensis*; (*right*) *Acer griseum*. A tree with beautiful bark and good autumn colour, suitable for the far end of small garden. Here it is underplanted with a winter-flowering heath (see p. 83)

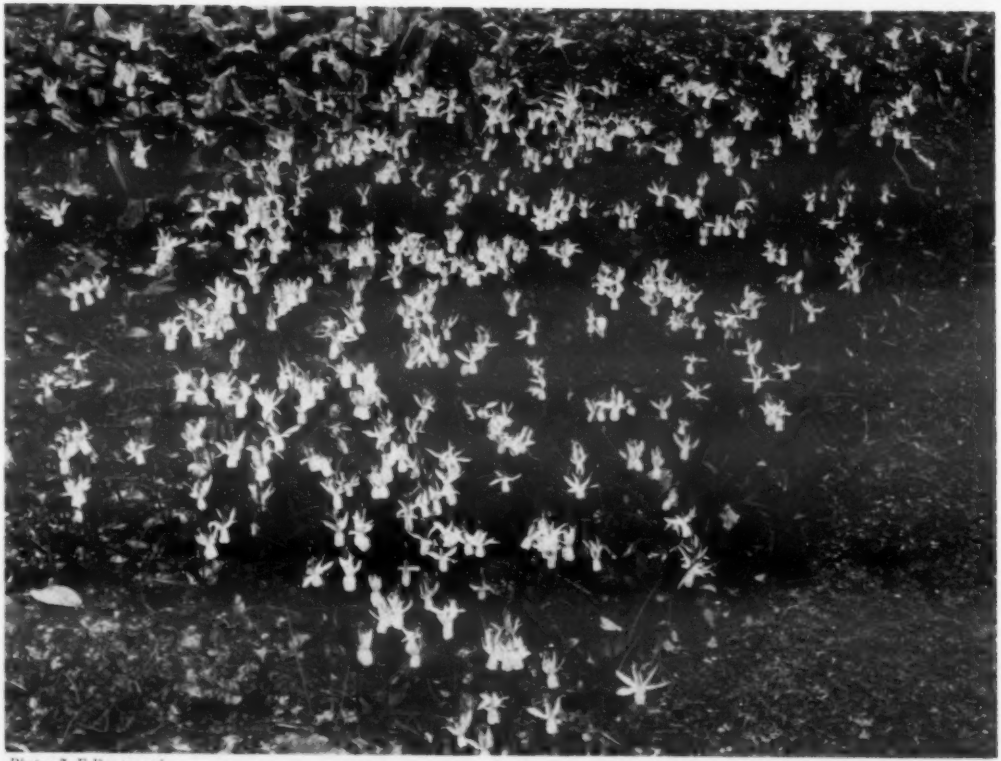


Photo: J. E Downward

FIG. 24—*Narcissus triandrus albus*, the Angel's Tears. A lovely bulb for growing in open spaces among the shrubs. A very fine group in the Savill Gardens, The Great Park, Windsor (see p. 84)

Photo: N. K Gould

FIG. 25—*Garrya elliptica*, male form. Award of Garden Merit, 1960. A useful shrub for winter flowering and foliage effect (see p. 96)

chlor-cresylic acid applied along the rows before the flies laid their eggs, and treatment of newly-set plants with tar distillate, corrosive sublimate (mercuric bichloride) and calomel (mercurous chloride) which were toxic to the eggs and possibly also to the young maggots. In practise these measures were not fully effective, partly because their success depended on accurate timing, repetition at intervals, and careful application to avoid damage to the plants. The extent of loss from cabbage root fly was greatly affected by the prevailing weather and while a small measure of protection could, in a wet season, turn the balance in favour of the crop by encouraging plant growth, in a dry season even small numbers of larvae feeding at the roots were sufficient to upset the water relations permanently and result in the wilting and death of the plants. When lindane, aldrin, and dieldrin became available WRIGHT (15) and his colleagues found that these insecticides gave a satisfactory control of cabbage root maggots and their use has, in the last few years become routine practice.

Observations on cabbage root flies have now been accumulated for well over a century (9) and a study of the records has helped us to understand what happens to the populations of an injurious species under field conditions. In investigations at Wye, MILES (11) has found that the greatest concentration of eggs at the roots of susceptible plants occurs during the month of May, and in some seasons the numbers of eggs per plant may total over a thousand. Counts have also shown that only a very small proportion of the larvae from these eggs succeed in establishing themselves and completing their development. Investigations at Wellesbourne (16) suggested that under the conditions there approximately 90 per cent of the eggs of cabbage root flies were devoured by predatory beetles, and after hatching there was a further loss of about half of the population in the course of larval and pupal development, again largely through predation and parasitism. It is evident therefore, that under natural conditions, there already exists in England, something like 95 per cent control of cabbage root flies by these natural agencies and interference with them is likely to increase the risks of loss to brassica crops. For this reason, it is advisable to use the effective insecticides as dips or drenches for the young plants before setting so as to avoid any unnecessary contamination of the soil in the field. At Wye College we use dieldrin spray on the soil blocks before the plants are set out in the field and find this method most satisfactory. I would here repeat the statement recently made by WRIGHT and HUGHES of Wellesbourne (18), for it is so important and merits the serious attention of growers. It is: "Indiscriminate use of (these) insecticides, when broadcast or mixed into the soil, may kill more of the natural enemies than of the pest itself, resulting in *greater damage to the plants than if no insecticide* had been used at all."

As far as we know at present, the phenomenon of resistance to the toxic action of insecticides has not occurred in the cabbage root fly but it may yet appear. In the United States and Canada, where aldrin and

dieldrin have been used extensively against onion fly (*Hylemyia antiqua* Meig.), a species closely related to cabbage root fly, resistance has developed to such an extent that these insecticides are no longer effective in some localities, and similar conditions may develop here in the case of cabbage root fly now that insecticides are used on brassica crops much more frequently than in the past. It was previously held that brussels sprouts, autumn cauliflowers and cabbages, which are set out about the end of May when the main spring egg-laying period was over, were safe from attack, and in examination of such plants at Wye few larvae have been found at their roots. It is now becoming general practice to treat these crops with protective insecticides and in consequence their effects on the soil fauna, beneficial as well as injurious, is more widespread. It may easily happen that in the future growers will have to cope with the long-term ill effects that may arise from this routine use of insecticides as an insurance against pests. Since the biological cycle of the cabbage root fly seems to preclude any severe attack on the brassicas that provide our winter greens, it is probably better to leave the insects undisturbed at that season and take all possible cultural measures to get the plants established quickly and to provide the right conditions for rapid growth.

CONTROL OF CARROT FLY

Before leaving the root flies that attack the roots of vegetables I must mention the carrot fly (*Psila rosae* F.). Perhaps no crop has undergone so great a change in its appearance in recent years. Many of you will remember that formerly it was not possible to obtain the clean-skinned unblemished carrots that can be seen in almost any greengrocer's shop today. In every sample of carrots as lifted many were marred by rusty tunnels and usually a large proportion of the crop had to be discarded as unfit for market. Carrots in private gardens suffered quite as severely as field crops, and no satisfactory control measures were available. Growers tried to prevent attack by arranging that the successive crops were grown as far away from each other as possible, and weeding and thinning were avoided at times when the flies were active. In the East Midlands ROEBUCK and his colleagues (1) found that carrot flies travelled from the previous year's site to the new crop along the hedgesides and headlands and attempts were made to destroy the sheltering flies by spraying the headlands. The sowing of main-crop carrots was delayed until midsummer in order to avoid attack by the spring flies, and repellent dressings of tar-oil, cresylic acid and naphthalene were used at intervals to prevent oviposition on early carrots in May and on main crops in August. None of these measures were really effective and every winter there were heavy losses among the stored crops. Now the use of lindane as a seed dressing has almost eliminated carrot fly damage from early carrots, and main crop carrots are generally protected by the incorporation of dieldrin or aldrin in the soil about the plants or by the use of dieldrin spray. Incidentally, WRIGHT (17), at Wellesbourne, has found that the dieldrin applied to main crop carrots is very persistent

in the soil and so I would assume that its use on successive crops on the same land may lead to an undesirable accumulation of the insecticide in the soil.

INSECTICIDES AND THE SOIL FAUNA

The efficiency of synthetic insecticides against various soil pests has resulted in their use as a routine precautionary measure and unfortunately they are now incorporated with fertilizers and applied on a field scale for such crops as potatoes. There is no justification for their general and indiscriminate use in the soil in this manner. An important constituent of cultivated soil is humus which affects the structure of the soil, its water-holding capacity and its fertility. Humus is produced from plant and animal remains by biological processes in many of which the soil fauna, particularly springtails and mites, play an important part. Studies of the total soil fauna have shown that these minute creatures are present in cultivated soils in hundreds of millions to the acre (7), and some evidence has been collected that use of persistent soil insecticides adversely affects both the springtails and certain species of mites more particularly those associated with decaying vegetable matter. Where persistent insecticides accumulate in the soil, their continued use is likely to upset the delicate balance among these obscure and sensitive members of the soil fauna and so indirectly to affect the maintenance of soil fertility. It should be remembered that in trials and demonstrations of insecticides attention is directed principally to their immediate effects on the insect pests under observation. Where a narrow cropping range results in the same crops and consequently the same insecticidal treatments occurring frequently on the same area it is perilous to ignore the possibility of unfavourable long-term effects. This should be taken into account when such substances as D.D. and Metham-sodium are applied to the soil against eelworms.

THE SYSTEMIC INSECTICIDES

For long it was hoped that a protective substance would be discovered which could be carried in the sap throughout the entire plant and by its presence and without affecting the plant adversely confer a degree of immunity to attack by sap-sucking insects and mites, and particularly aphids, leaf-hoppers, scale insects and possibly thrips. In the alkaline zones of California some plants showing immunity to insect attack were noticed and investigation showed that this immunity was related to the presence in the plants of selenium in the form of sodium selenite. The selenium was taken into the plants through the roots and was distributed throughout the tissues, and the term "systemic poison" was introduced to describe the insecticidal substances that acted in this manner. Unfortunately selenium salt was not only toxic to sucking insects it was also injurious to mammals and therefore it could not be used on plants destined for human food though it was satisfactory for the cotton crop and for flowers and other ornamental plants. Once the search for other

systemic substances was started it was not long before the organo-phosphorus substances were discovered and marketed as systox and schradan (Pestox). These two substances were found to act as systemic poisons and gave effective control of aphids but they also carry a mammalian toxicity hazard through their action as cholinesterase inhibitors (8). Other organo-phosphorus compounds have been introduced that break down more quickly and when used on vegetable crops are somewhat less dangerous to mammals. These substances under such names as metasystox, phosdrin and parathion, are now widely used but they are dangerous to handle and operators must wear protective clothing during the preparation and application of the insecticides and during the disposal of empty containers (2).

There are still some growers who are reluctant to use these highly toxic substances and are satisfied with the level of control that can be obtained by the use of the plant-derived materials like derris, nicotine and pyrethrum with which they are more familiar. For these growers a further insecticide may soon be available in the form of ryania derived from the West Indian plant, *Ryania speciosa* Vahl. This substance has been found to be effective against noctuid caterpillars and tortricids generally, and against codlin moth in orchards. It may well prove useful to market growers for use on salad crops, on brassicas against diamond back moth (*Plutella maculipennis* Curt.) and the garden pebble moth (*Pionea forficalis* L.) and on leeks against the leek moth (*Acrolepia assectella* Zell.).

REMARKABLE ACHIEVEMENTS IN PEST CONTROL

In these lectures I can only set before you selected aspects of the present position with regard to the control of insect pests of horticultural crops. During the years since the end of World War II a remarkable range of highly toxic and persistent substances have been made available for use as insecticides and they have given us a better measure of pest control than has ever before been obtained. But we have not been able to *eradicate* injurious insects; indeed, we have found that the problems of pest control are more intricate than we had imagined. Great reductions in the amount of damaged crop have followed the use of persistent insecticides and these have been incorporated into practice on a very great scale, but we have found that the immediate reduction of insect damage is not the only factor to be taken into account.

The synthetic insecticides have proved to some extent selective, that is, they do not affect all kinds of insects equally, and in consequence the strengths at which they are used have been calculated so as to give maximum efficiency against specific pests, while at the same time producing a minimum effect on beneficial species, particularly the predatory insects in fruit plantations and in the soil. For some time it was not fully apparent that the insecticides also acted selectively within the injurious species against which they were used. The result of their repeated use has been the destruction of the more sensitive forms within a species and

the less sensitive or "resistant" forms have survived and multiplied. This character of "resistance" is inherited, and in consequence the regular use of insecticidal substances can so change the nature of the injurious species that it no longer responds to treatment that was at first highly successful. I emphasized this in my first lecture and instanced the resistance developed by codlin moth to lead arsenate. It is relevant that DR. C. POTTER and his colleagues at Rothamsted are investigating the mode of action of certain of the organo-phosphorus insecticides and carrying out parallel studies of the bio-chemical aspects of insect resistance to synthetic substances used as insecticides. A fuller understanding of these matters must await the outcome of this important work. In the meantime, those concerned with the practice of insect control find that seasonal alternation of equally satisfactory insecticides appears to be one way of combating the tendency to develop resistant strains of insects in fruit plantations and market gardens.

I have stressed the important role of parasites and predators in checking the development of excessive populations of injurious insects, but we now find that beneficial and injurious species should be studied. In the past biological studies have mainly concerned injurious species, together if we are to understand the natural balance of the population and the degree of interrelation between the several species that are associated ecologically. It is also necessary that insecticidal chemicals should be tested for their effects on the complex of insect and other species that are associated or dependent on one another through their food habits. It has become increasingly evident that either insecticides should destroy the entire injurious population in any site and thus render unimportant the effects on associated beneficial species, or they should reduce the harmful species while leaving unimpaired the delicate natural balance within the fauna. Growers would prefer the former but naturalists might complain of the subsequent disappearance of interesting species. This growers' ideal of complete eradication of injurious species is still a long way from realization, and the available insecticidal substances often have phytocidal or other side-effects that limit their use to minimal amounts.

IMPORTANCE OF GARDENS AND HEDGES

At present gardens and hedgerows serve as reservoirs for our natural fauna. In England and Wales gardens and lawns with their varied assortment of native and introduced trees, shrubs, perennial herbaceous plants and annuals, surrounded by hedges of privet, yew, holly, lonicera, beech and hawthorn, cover over 1,000,000 acres and field hedges occupy another 2,000,000 acres. This vast area sustains many thousands of species of insects whose actual numbers defy computation. Many are beneficial in that they are pollinators of fruit and seed crops and are important in agriculture as well as horticulture (12). Prior to the use of the synthetic insecticides the pollinating insects were little affected by insecticidal treatments. The "stomach" poisons and "contact" poisons

formerly used were short-lived and usually applied at pre- or post-flowering periods when the numbers of bees about the crops were at a minimum. The persistent insecticides such as DDT and BHC now used in orchards during the pre-blossoming period leads to serious mortality among the local populations of wild and hive bees and of flies, and although this may not be reflected in the numbers of fruit set in the orchards it may later result in the poor pollination of such crops as beans and clover. It has also been observed that some of the systemic insecticides used for aphis control may contaminate the nectar of the treated plants (14) and it has been recommended that Metasystox, for example against bean aphis should be applied in the evening when bees are no longer active, so that by the following day some of the contact toxicity has had time to disappear. The problem of safeguarding pollinators is perhaps greatest when flower and vegetable seed crops have to be protected from pollen beetles (*Meligethes*) at the time when the presence of bees, flies and other beetles may be essential for a good set of seed.

Gardens and hedges have a rich and varied insect fauna of little immediate economic importance. There are many leaf-eating caterpillars, often large like those of hawk moths, bizarre or grotesque like those of the poplar kitten (*Cerura bifida*), the puss moth, and the peppered moth, or like those of sawflies, feeding along the edges of leaves and waving their up-turned tails. There are also larvae of many flies, moths, sawflies and beetles which make their presence known by winding tunnels in the leaves or by reducing the leaves to an intricate pattern of veins. Here, too, can be found the caterpillars of the silver "Y" moth and some of the owlet moths that feed indiscriminately on almost any foliage available and on roots and underground stems, and the gall-formers that make their characteristic galls on leaves and stems. There are also large numbers of scavenging insects, including the Collembola, fungus gnats, *Sciara* spp., *Drosophila*, and *Bibio* spp. and predatory and parasitic insects of many sorts. In these natural populations there are carriers of fungoid, bacterial and virus diseases of insects. In England we have not made use of these serious insect diseases for the control of insect pests but in Canada where spraying and dusting are not practical for the control of forest insects, virus (polyhedral) diseases of the pine sawfly have been released in certain areas and they have developed sufficiently to check defoliation by pine sawfly caterpillars to such an extent that these insects are no longer a threat to the productiveness of the forests. But the virus diseases of insects, like the synthetic insecticides, may also be followed by the development of resistance in the injurious species and this will limit their use. Canadian workers have tried to avoid the rapid development of resistance in the pine sawfly by the use of two viruses at once and long-term results are still being studied.

CONCLUSIONS

It is recognized that all natural control measures have certain limitations the most important of which is that they are never 100 per cent effective.

In the future we are likely to see further pressure for more and better horticultural products and there seems no doubt that the search for better but less hazardous insecticides will go on at an increasing rate. In the meantime market growers should use insecticides judiciously, especially those for application to the soil, so as to keep the insect populations well balanced between the vegetable feeders and their parasites and predators and avoid creating adverse conditions for the vast population of inconspicuous soil animals that have so great an effect on fertility. Such a policy would limit the development of greater capacity for resistance among the species that are regularly injurious to crops.

In the more general context, I have referred to our home gardens that constitute a valuable reservoir for a great range of insects, harmful and useful, that share our environment and contribute much to our interest and enjoyment. I have said that this large area is supplemented by a still greater area of hedgerows, road verges and hedge banks, with a different and equally diverse insect life. The inter-play of biological factors in this great area affects the whole countryside and does much to buffer the insect fauna against extreme fluctuations resulting from the use of plant and animal toxicants in agriculture and commercial horticulture. Gardens, hedges, waste land and road verges thus play an important part in constantly restoring the ecological balance on which the success of our husbandry depends. The Nature Conservancy, under its Director, MAX NICHOLSON, is alive to this aspect of conservation. It is also of great significance that some research workers concerned with animal nutrition and animal health now see great virtue in such hedgeside plants as nettles, dandelions, buttercups, and tufted vetch as sources of minerals and trace elements for grazing animals (3) and make a strong case for the retention of hedges in our general landscape.

As individuals, we do not always understand the intricacy of the biological equilibrium of the environment which contributes so greatly to our leisure and pleasure, but we should nevertheless be prepared to defend it against the ill-considered or selfish use of chemical and radioactive hazards, the immediate effects of which are obviously undesirable and the long-term effects quite unforseeable.

THE CHAIRMAN: We have all enjoyed the fine pictures with which the lecture was illustrated.

DR. MILES has certainly had an influence on me and my attitude to insects. I thought they should all be killed, but he has almost convinced me that it is irresponsible to go out and kill them indiscriminately.

Now if there are any questions, I am sure PROFESSOR MILES will answer them.

MR. BAKER: With regard to systemic insecticides, we read that the aphids absorb the systemic insecticides into their bodies by means of their

probosces. I should like to ask, has it been observed that predators eating the bodies of such aphids which had absorbed the systemic insecticides, have been affected?

PROFESSOR MILES: As I understand the position there is a steady dilution and modification of these poisonous substances as they pass through the aphids, but some of the poison is ingested by the predator that eats the aphids. It is cumulative and takes a little longer to affect the predator. Of course the poison is gradually broken down in nature and at the edge of a treated area the influence of the systemic poison will be less effective and finally be dispersed.

MR. COLLINS: PROFESSOR WIGGLESWORTH, at the Amos Memorial Lecture, said some people think we should tolerate a certain number of injurious insects on our trees but he had yet to see anyone tolerate a certain number of fleas in his bed or lice on his person. The idea of the scientist was to eliminate these pests entirely: apparently you think a certain amount of tolerance is a better course of action: is that so?

PROFESSOR MILES: As far as our fruit trees are concerned, I think a sensible grower wants to eliminate only the major injurious insects. As that is technically impossible without affecting beneficial species he recognizes that he is likely to have some survival of the pest species. With the survival of representative species, the balance will not be too violently upset. No, we cannot yet select effectively only the injurious insects for destruction. As stated in my lecture American growers have been using regularly synthetic insecticides to control onion fly in market garden areas, and have found that resistant strains of the onion fly have developed. So far we have not needed to use insecticides so generally or so frequently here, so as yet there is no evidence that we have resistant strains in this country. If we use insecticides unintelligently and when they are not required we shall have unnecessary trouble. I think that at present we have to tolerate a minimum number of pest species.

A LADY MEMBER: The difficulty is to recognize the good from the bad. Is there a Government pamphlet? A short time ago I was destroying certain grubs, not knowing they would develop into ladybirds.

PROFESSOR MILES: There is an excellent bulletin on beneficial insects issued by the Ministry of Agriculture and recently revised by MR. B. D. MORETON, who has been working on this subject.

Incidentally if you were at the Chelsea Show this year you may have seen the Society's fine exhibit of beneficial insects which DR. BECKER staged, that exhibit created a good deal of interest in the subject and showed clearly the Society's concern about the whole subject.

DR. BECKER: If I may add to PROFESSOR MILES's answer to the question about allowing for a little damage: This is a point which can be borne

in mind more by the amateur than by the commercial grower. The commercial man must have perfect produce; he cannot sell damaged or marked fruit and vegetables; but the amateur can tolerate these to a greater extent in his own garden, and he should compare the cost of the insecticide with the increase in value of his produce after spraying. He must also consider carefully the potential results of destroying the large numbers of beneficial creatures in his garden. In my garden I use a minimum of insecticides. I do not mind if the apples have a little capsid damage on them: nor do I mind if there are a few with codling damage. The gardener must learn what pests are prevalent in his area and in his garden. Those which he knows will severly damage his produce he can try to control, but if only a small proportion of his crop is likely to be injured, it may be worth while to save his money, not spend it on insecticide.

THE CHAIRMAN: I thought those pictures of the carrots after spraying, were convincing. I have to spray my carrots, otherwise I would not get any good enough to eat. The other crop I always have to spray with DDT are garden peas. If I do not, the pea moth lays its eggs and when I pick peas I have caterpillars in the pods.

We are delighted, PROFESSOR MILES, that you have given us these two talks and shown us your interesting slides.

There is not a big attendance today but those who have come are of high standing amongst the Fellows of the Society. We have thoroughly enjoyed your lectures and hope you will come back in future years and give us further talks.

I am sure you will like to join me in thanking PROFESSOR MILES for his two stimulating lectures. (*Applause.*)

The proceedings then terminated.

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AWARD OF GARDEN MERIT–XCVII

452 GARRYA ELLIPTICA, Male form

Award of Garden Merit, July 12, 1960.

Garrya elliptica (Fig. 25) was introduced by DOUGLAS to this country from the Western States of North America in the early part of the nineteenth century. Some sixty years later in 1884 it was awarded a Botanical Certificate. After a lapse of forty-five years it received the Award of Merit when shown by the late LADY LECONFIELD in 1931. Now, thirty years later it has received the Award of Garden Merit.

G. elliptica has long been a familiar plant to the milder parts of the country but is still relatively uncommon in colder gardens. Perhaps as a native of the coastal areas of the States of Oregon and California, it has been suspect and its hardiness doubted. Certainly some of the finest specimens of it are to be found in the West Country. However, it has stood up well to the all-too-frequent severe winters of the last twenty years. This does not mean it can be planted anywhere in a cold garden. It should be given, in such a garden, the protection of a wall or of other evergreen shrubs. It is well to bear in mind when choosing a site for *G. elliptica* that in its native habitat it grows in a community of plants, all hard-leaved, woody evergreens, called chapparral, and somewhat similar to the Mediterranean macchia.

Perhaps a further reason for its increasing popularity is due to a change or one might say an improvement in taste. *G. elliptica* is not a conspicuous plant when out of flower. Its leaves which are a dark, shining green, some 1½ to 3 inches long and more or less rounded at each end, have wavy margins and their under surface is grey woolly. Its appearance is therefore sober without being dull, but it can act as a splendid foil for other more conspicuous flowering plants. Its attraction is in its slender, pendent catkins which occur during the winter months. They are a soft grey or yellowish green and though normally 3 to 6 inches long, can be as much as 1 foot long in warm climates. They are in clusters at the end of the shoots and in the leaf axils. They are always more numerous in the male plant and for this reason it is the male form which has been selected for the award. Their colour and the elegance of their form lend themselves admirably for the decorative arrangement of flowers in which there is so much interest at the present time.

G. elliptica does not require a particularly rich soil in cultivation. Where necessary it should receive some protection, and it is advisable to plant it out of reach of cold north and easterly winds and early morning sunshine to avoid the browning of its leaves in a severe winter. It can be 6 to 12 feet high in this country and as much again through. Cuttings taken in the late summer root with little difficulty. It is preferable to grow on the young plants in pots as it resents root disturbance.

G. elliptica, male form is figured in the *Botanical Magazine*, N.S. **170**, t. 220.

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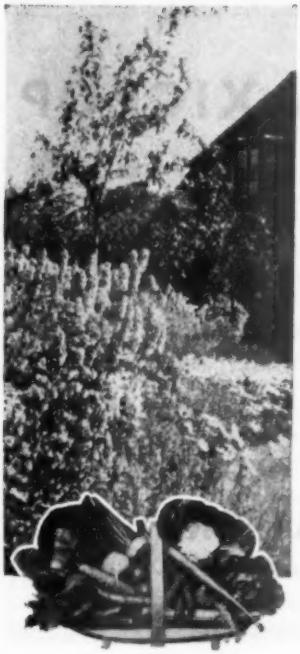

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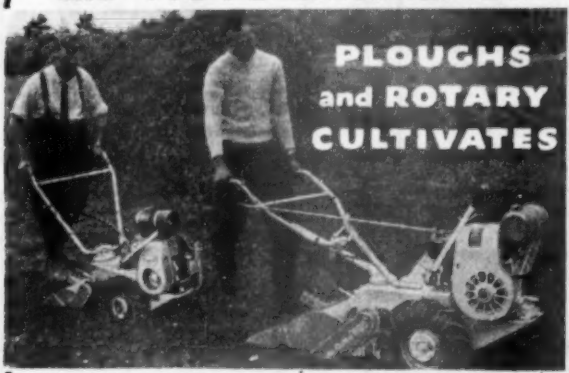

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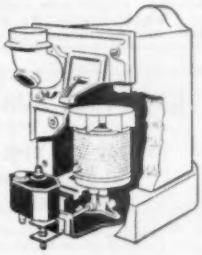

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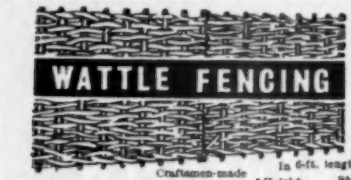

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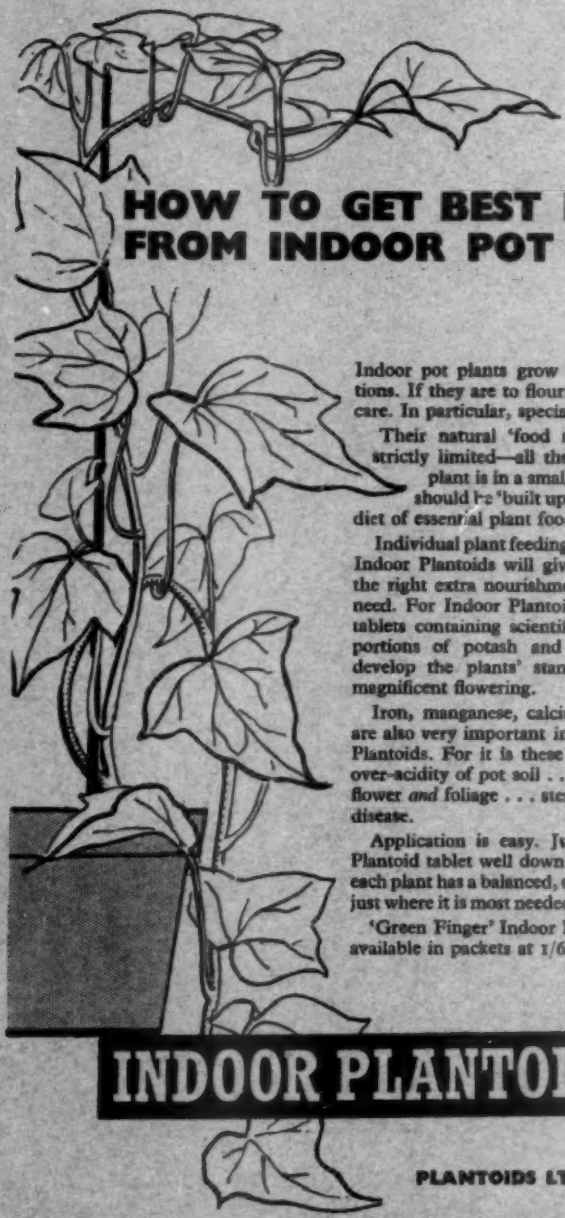

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